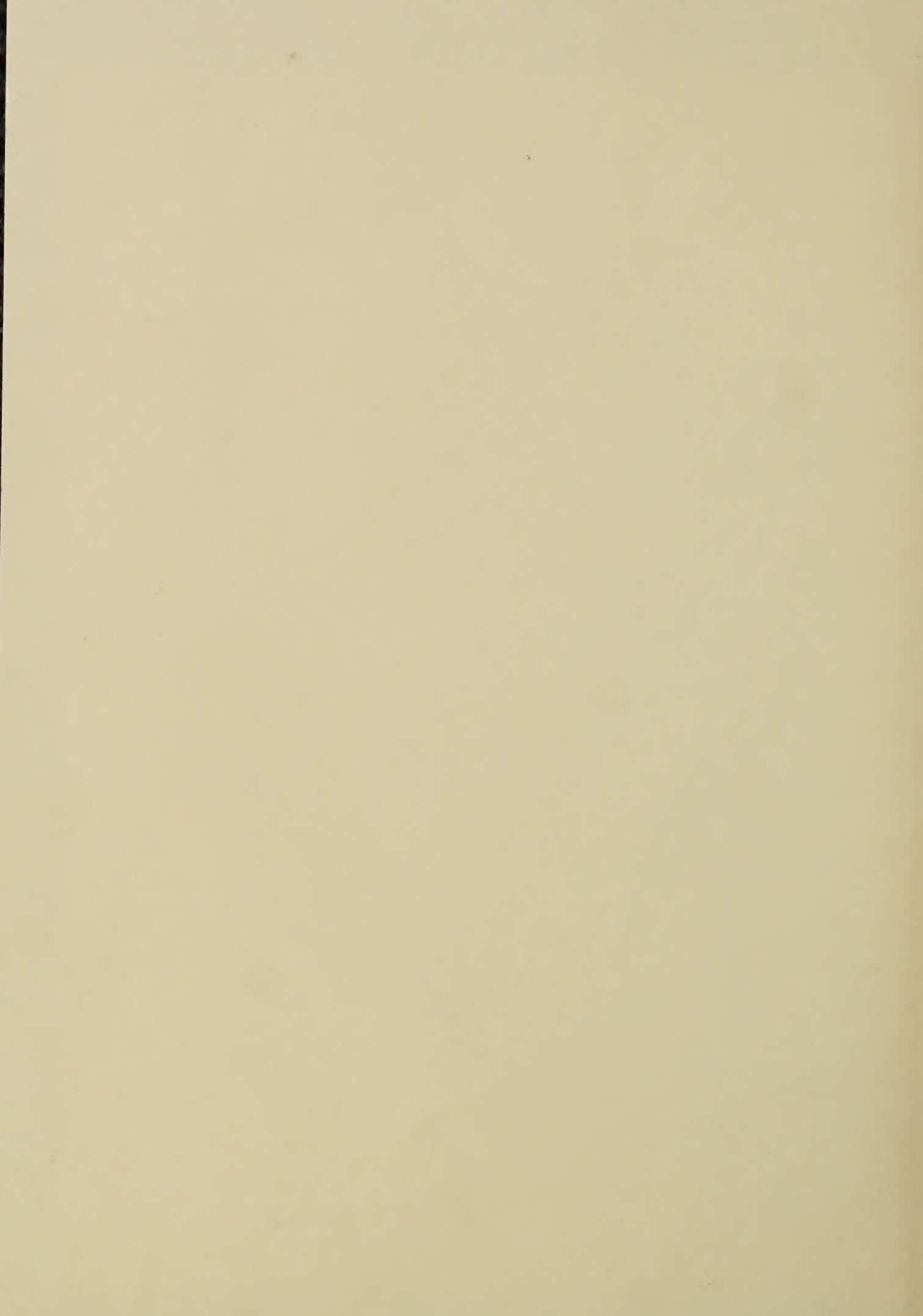


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Department of  
Agriculture



Forest Service

Forest Pest  
Management

Davis, CA

**CRITIQUE OF THE NATIONAL  
PESTICIDE MANAGEMENT  
TRAINING COURSE  
FEBRUARY 18 - MARCH 1, 1991  
MARANA, ARIZONA**







FPM 91-5  
July 31, 1992

CRITIQUE OF THE NATIONAL  
PESTICIDE MANAGEMENT TRAINING  
COURSE FEBRUARY 18 - MARCH 1  
1991 - MARANA, ARIZONA

1. Provide recommendations to Director, Forest Pest Management for future FPM sponsored training - what, how, when, where, and why.
2. Document the planning, conduct, and evaluation (faculty and students) of the third National Advanced Pesticide Management Training Course for reference in planning future courses.

As chairperson of the planning committee I take this opportunity to express thanks to the FPM staff especially Roger Carter who provided valuable advice and assistance in helping to plan, conduct, and evaluate the national course at Marana. I believe NPMTC and FPM, as partners, have significantly advanced the level of professional development of its students and have met the standards in quality of training. I am confident that the partnership will continue and evolve to keep pace with the technological demands being placed upon our line and staff personnel.

Prepared by:

John W. Barry  
Chairperson

---

USDA Forest Service  
Forest Pest Management  
2121C, Second Street  
Davis, CA 95616  
(916) 758-4600





## PREFACE

The USDA Forest Service, Washington Office, Forest Pest Management (FPM) staff in cooperation with the Washington Office National Advanced Resource Technology Center (NARTC) sponsored the third National Advanced Pesticide Management Training Course at the NARTC facility, Marana, Arizona, February 18, 1991 - March 1, 1991.

The purpose of this document is to:

1. Provide recommendations to Director, Forest Pest Management for future FPM sponsored training - what, how, when, where, and why.
2. Document the planning, conduct, and evaluations (faculty and student) of the third National Advanced Pesticide Management Training Course for reference in planning future courses.

As chairperson of the steering committee I take this opportunity to express thanks to the NARTC staff especially Roger Corner who provided valuable advice and assistance in helping us plan, conduct, and evaluate two national courses at Marana. I believe NARTC and FPM, as partners, have significantly advanced the level of professional development of its students and have set new standards in quality of training. I am confident that the partnership will develop and evolve to keep pace with the increased technical demands being placed upon our line and staff personnel.

JOHN W. BARRY  
Chairperson





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## SUMMARY OF COURSE CRITIQUE

The course critique was held at Albuquerque, New Mexico on May 14-15, 1991 attended by members of the National Pesticide Training Steering Committee. The committee critique the course with the purpose of developing recommendations for future training. Questions from management were discussed that related the training scope and costs, responsibilities (WO vs Regions), and national standards. Student comments on the course were positive and constructive. Specific comments on course shortcomings related to trainee's individual needs. The steering committee, appointed to plan future courses, should meet 12 months ahead of the course. More distant planning was shown to be counterproductive due to personnel changes. Future training considerations include defining training audience and needs, recognize need for Forest Service to provide national leadership, and strong commitment by Regions in supporting course. Given the numerous comments from students, faculty, and management that strongly support future pesticide use training, while recognizing the complexities of pesticide use, the committee recommended that a committee be appointed to develop a strategic plan for training. Additional recommendations are included in this report.





## RECOMMENDATIONS

The following recommendations were developed by the National Pesticide Training Committee:

1. Maintain a National focused and facilitated pesticide-use training program and organize on a module (course) concept.

Action: Director, FPM through Steering Committee

2. Retain training goal - "To provide a forum for pesticide technology transfer".

Action: Director, FPM through Strategic Plan

3. Draft a strategic plan for national FPM pesticide-use training and submit it to the pesticide-use coordinators for their input and approval.

Action: Steering Committee

4. Place training as a topic on the national pesticide-use management meeting to be held 1992.

Action: Assistant Director, (PUM&C) FPM

5. Develop budget procedures for pesticide-use training.

Action: Steering Committee

6. Survey alumni of past NARTC pesticide courses to determine how they have/are applying their training.

Action: Chairperson, Steering Committee

7. Appoint additional pesticide-use coordinators to committee.

Action: Director, FPM









United States  
Department of  
Agriculture

Forest  
Service

Washington  
Office

2121 C Second Street  
Davis, CA 95616

Reply To: 2150

Date: April 12, 1991

Subject: National Advanced Pesticide Management  
Training Program

To: Members, National Steering Committee

The National Steering Committee will meet at Albuquerque, New Mexico, May 14-15, 1991 to critique the 1991 course and to recommend future direction in national pesticide management training. I anticipate we will spend less than a day critiquing what we have done and the balance developing recommendations on what we feel should be done in the future. The meeting will emphasize strategic planning of pesticide training and we need your input.

Please give some thought to what your Station, Region or Area believes the scope of the Forest Service's leadership role should be in managing and/or conducting pesticide use training both nationally and internationally. Management decisions on these matters will be influenced by the committee recommendations. Assuming that FPM will be emphasizing an increasing leadership role in pesticide-use training and technology transfer, the committee should discuss and recommend how and by whom this might be accomplished. Projecting future training needs and identifying the trainee audience within the national and international arena will be our challenge.

As a reference during the meeting I am preparing a course report that includes student critiques, your comments, and other information we may need during the critique.

A draft agenda is enclosed for review and comment. We can make adjustments to the agenda at Albuquerque.

Roger Corner (602) 670-6414 has reserved a meeting room and a block of rooms at the Hilton, 1901 University Blvd. NE, Albuquerque, New Mexico 87102, (505) 884-2500. To be assured of the government rate please make your reservations as soon as possible. Give me a call at FTS 460-1715 or (916) 758-4600 if you have any questions.

/s/ John W. Barry  
JOHN W. BARRY  
Chairperson

cc: Ken Knauer

Enclosure





AGENDA  
(Revised 5-8-91)  
STEERING COMMITTEE MEETING  
NATIONAL ADVANCED PESTICIDE MANAGEMENT TRAINING

May 14, 1991

Discussant  
Leader

0800

Introduction

Jack Barry

Purpose of the meeting  
Expected accomplishments

0815

General Discussion

Roger Corner

Course planning  
Course purpose and goals  
Unit objectives  
Lesson subjects  
Length of course  
NARTC administration  
NARTC facilities  
Evergreen facilities  
    field, mess, lodging  
Supplies and equipment  
Budget  
Students  
    Class size, background, needs,  
    organization, diversity  
Lesson presentations  
    Lectures, practical exercises,  
    laboratory exercises, field exercises  
Faculty  
    FS, non-FS government, industry  
Student group work problems  
Evening session  
Relaxation and recreation

1130

Lunch

1300

Aviation and Safety Training

Bob Adams

1330

Student Critique Comments

Julie Weatherby

Did course support its objectives?  
Did instructors relate to practical  
    situations?  
Did instructors use class time well?  
Was adequate time allowed for  
    questions, etc?  
What topics should be increased/decreased?  
What course materials should be available  
    before the course?  
What other suggestions, recommendations?

May 14, 1991  
Cont.

Discussant  
Leader

1500                    Faculty Critique Comments

Jesus Cota

Written comments  
Verbal comments

1630                    Adjourn

May 15, 1991

Discussant  
Leader

0800-0830            Forest Pest Management

Ken Knauer

Training and Technology Transfer Policy  
Strategic Planning -  
objectives and process

0830-1030            Future Training Needs

Ken Knauer

Do we need national/international  
pesticide-use training?  
What type training will be needed in  
1993-1995?  
National vs Region / NA training?  
Who should have responsibility?  
WO or WO contract a Region or NA?  
Frequency of training?  
Where should it be conducted?  
Sources of faculty/cadre?  
Budget level?  
Modular type course?  
Insecticide vs herbicides?

1030-1130            Recommendations

Jack Barry

1130-1300            Lunch

1300-1500            Recommendations continued

1500-1530            Conclusion

Jack Barry

Summary  
Follow-up

1530                    Adjourn

# NATIONAL ADVANCED PESTICIDE MANAGEMENT TRAINING

February 18 - March 1, 1991

## STUDENT INFORMATION SECTION

Name of Nominee: \_\_\_\_\_

Working Title: \_\_\_\_\_

Agency: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_

DG Address: \_\_\_\_\_

Computer Familiarity: PC \_\_\_\_\_ DG \_\_\_\_\_ Both \_\_\_\_\_

## SUBMITTING OFFICE SECTION

Submitting Office: \_\_\_\_\_

Name of person at Submitting Office as Contact  
Point: \_\_\_\_\_

Address: \_\_\_\_\_

Priority #: \_\_\_\_\_

Priority #1 is the highest. Prioritize all  
nominees submitted.



## For information contact:

**DIRECTOR**  
National Advanced Resource  
Technology Center  
Pinal Air Park, Marana, AZ  
85653  
FTS 762-6414  
Comm. (602) 670-6414  
DG: NARIC: WQ6A  
FAX: (602) 670-6413

FEBRUARY 18 - MARCH 1, 1991

National Advanced Resource  
Technology Center





This 70 hour course is designed to prepare Forest level professionals to coordinate and manage pesticide training and use activities. Students will be provided classroom instruction and field exercises covering pesticides, pesticide application, and environmental monitoring.

## **OBJECTIVES**

Upon successful completion of the course, the attendees will be able to ...

- Provide Region and Area pesticide-use training.
- Conduct quality pesticide projects using State-of-the-Art technology.

## **COURSE GOALS**

To provide a forum for pesticide technology transfer.

Silviculturists, Range Conservationists, Entomologists, Pesticide Coordinators, and Managers responsible for coordinating and conducting pesticide training and pesticide projects.

## **PREREQUISITES**

Priority will be given to persons whose current or future assignments involve responsibilities for coordinating and managing pesticide use training and pesticide projects.

## **COST**

There is no tuition charge. Cost of the training to the unit involves per diem, salary, and travel. Lodging and meals available at Pinal Air Park are well within standard per diem allowance.

## **NOMINATIONS**

Tear off the end portion and fill in information on the back for nominations. Nominations are due Nov. 1, 1990. **Nominate only one person per sheet.**

- Forest Service nominations to be submitted through Regional Office, Area Office, or Station directly to NARTC.

- Bureau of Land Management nominations shall be submitted through the State Office directly to NARTC.

- All other Federal Agencies will nominate through Regional or Area Offices to the appropriate National Office Level division, which will submit the list of nominees to NARTC.

- Non-Federal nominations should be submitted through the appropriate State and Private Representative of the Forest Service.

Nominations must include the name, work address, telephone, working title, and agency the nominee represents.

**Nominations Due ...**  
Nov. 1, 1990

**Notification of Selection ...**  
Dec. 7, 1990

**Mail to:**

**DIRECTOR**  
National Advanced Resource  
Technology Center  
Pinal Air Park, Marana, AZ 85653

FTS FAX: 762-6413  
Comm. FAX: (602) 670-6413

Jack Barry's  
Comments and Observations on the  
1989 National Advanced Pesticide Management Course

1. Keynote address should include visionary views from Chief and Staff, S&PF, and FPM. Consider having Chief tape a 15-minute presentation. This is a chance for WO to deliver its message, but it should be a WO message - not a message necessarily tailored to satisfy the troops.
2. Ground equipment training should be given at least equal time to aerial. Forest Service staffs should be committed to support this training and to provide appropriate on-site, hands-on experiences.
3. There should be no talk shorter than 50 minutes, and time should provide for questions.
4. Consider keynote address or Chief's video the evening before course begins.
5. Have some hands-on opportunities for students early on.
6. Use practical exercises as a teaching technique to actively involve students and build interest in presentations.
7. Limit unit leader responsibilities to only one instructional unit.
8. First unit should present a course review - go over objectives, etc. (Will need to do this during course welcome.)
9. Maintain realism in course - students like real world examples.
10. Identify the core faculty that should stay on-site throughout the course.
11. Emphasize roles and responsibilities of unit leader.
12. Have pilots involved in panel discussions.
13. Involve Forest Service Research in course.
14. Instructors should take responsibility for obtaining handouts - very popular and this needs to be better organized in the future.
15. Identify individual students early who are needed to assist in field or other activities.
16. Calibration lecture needs more time including in-class and maybe outdoor practical exercises.
17. Lesson on properties of formulation needed.
18. Lesson on nozzle types - field strip, etc.
19. Need better coordination with industry so they will demo, etc.

20. Include pilots in safety briefing. Have a trained aircraft safety person give presentation - maybe a video is available.
21. Instructors not committed - no protocol for arriving and departing. Casualness about evening briefings, too mobile.
22. Improve lecture on weather - need more on spray weather.
23. Lesson on toxicology.
24. Course needs to have more of an advanced orientation.
25. Need a publication on A-B-C's of calibration and nozzles.
26. Consider more industry and university types involved in course.
27. Unit leaders need to insure instructors attend the Marana faculty meeting.
28. First and last day need to be special - stimulating!
29. Student scenarios are excellent and need to incorporate knowledge gained in course.
30. Panel - evening of non-Forest Service people discussing their pesticide problems, experiences, etc.
31. Students want updated information - no theory, but they do want advanced stuff.





United States  
Department of  
Agriculture

Forest  
Service

Washington  
Office

2121 C Second Street  
Davis, CA 95616

Reply To: 2150

Date: June 28, 1991

Subject: Notes of the May 14-15, 1991,  
Albuquerque, New Mexico Meeting

To: National Pesticide Training Steering Committee

On May 14-15, 1991 the National Pesticide Training Steering Committee met at Albuquerque, New Mexico to critique the 1991 National Advanced Pesticide Management Training Course and to discuss future national pesticide-use training.

#### MEETING PARTICIPANTS

Bob Adams	-	NA/FPM
Jack Barry	-	WO/FPM
Roger Corner	-	WO/NARTC
Jed Dewey	-	R-1/FPM
Harold Flake	-	R-8/FPM
Ken Knauer	-	WO/FPM
Tim McConnell	-	R-6/FPM
Dan Neary	-	SE Station/FIDR
Doug Parker	-	R-3/FPM
Terry Rogers	-	R-3/FPM
Julie Weatherby	-	R-4/FPM

#### GUESTS

James O. Pierce  
Director, Southern California Education Resource  
Center for Occupational Safety and Health  
Institute of Safety and System Management  
University of Southern California  
Los Angeles, CA 90089-0021  
(213) 740-4038 FAX (213) 740-5943

Richard Brown  
Southern California Safety Institute, Inc.  
3858 Carson St., Suite 210  
Torrance, CA 90503  
(213) 540-2612 FAX (213) 540-0532



### COURSE CRITIQUE

The USDA Forest Service, Washington Office, Forest Pest Management (FPM) staff in cooperation with the Washington Office, National Advanced Resource Technology Center (NARTC) sponsored the third National Advanced Pesticide Management Training Course at the NARTC facility, Marana, Arizona, February 18, 1991 - March 1, 1991.

Committee participants and guests were provided a copy of the draft FPM 91-5 report Critique of the National Pesticide Management Training Course February 18 - March 1, 1991, - Marana, Arizona. The report documents the planning, conduct, and evaluations (faculty and student) of the third in a series of national advanced pesticide management training courses for reference in planning future courses. The final report will include a summary of this Albuquerque meeting recommendations and an executive overview. Specific comments from students, faculty, unit leaders, and students are contained in the report. Other comments during the committee meeting follow:

#### Ken Knauer's Observations

Course is becoming more popular and people expectations is coming faster than we can keep-up.

Marana is being considered as an international course and replacement for Cranfield. (Cranfield focused only on pesticide application technology.)

FS has commitment to provide training - at risk if we do not do it - is our liability and credibility.

Jim Space likes idea of training of trainers. Regions need to carry on training and WO needs to set standards.

Need to develop a training cadre.

Course needs sharper focus and course offering more sharply defined.

Who are we trying to reach with national training?

What is role of pesticide-use coordinators in training? They should be responsible for Regional/Area training.

Need to remain cost conscious.

### Student Comments

Want "war" stories - this is increasing as newer employees join the FS.

Want practical application.

Like hands-on instruction.

Like and want more group problems.

Need more on safety and ground application.

Need more time for student interactions.

Need lessons on project design and management.

Need videos of actual case projects.

Reduce class size as 67 is too large for well conducted field problems.

Insure that instructors use the student notebook which students felt was a good idea.

Plan exercises to solve problems, making exercises more meaningful.

### Course Planning

Steering Committee should meet one year ahead of course date. Faculty meeting at Marana needs to be more formally structured. Need a solid commitment from unit leaders and faculty. Need to complete course outline at faculty meetings.

### Other Observations and Considerations

Who is target audience?

Course attempted to do too much for too broad an audience.

State cooperators on the other hand liked the broad subject approach.

Need management commitment to sending appropriate students - not technicians.

There is national need to disseminate national information.

Contractor might develop course and Forest Service deliver course.

Local level training does not satisfy all pesticide training needs.

Identify lead Regions/Area for organizing and presenting specific types of national level training.

Where does proposed "Green Card" system fit into pesticide training?

How might personnel training be monitored and managed?

Steering committee should be composed of more pesticide-use coordinators.

Concern about qualification (knowledge and training) of pesticide-use coordinators.

Course brochure, produced by NARTC, should include course subjects.

Faculty was too large to be manageable but need to maintain a diverse faculty.

Some faculty lacked commitment to the course.

Unit leaders are key faculty members and should "take charge" of their instructors.

#### FUTURE OF PESTICIDE-USE TRAINING

##### Motivation to continue providing national training.

FS has and accepts responsibility.

FPM has expertise and access to experts.

International void in training available  
(e.g. Canfield is no longer in operation).

Training needed to qualify personnel for jobs requiring specific skills.

##### Motives for re-thinking status quo

Budget can't continue as open ended.



Marana can't continue to offer something for everybody in one course.

Wanted to revisit objective of training the trainers.

### Pesticide Training Levels

Pesticide-use training, as reported by meeting participants, is conducted at the District, Forest, and Region level and such training is usually presented by pesticide-use coordinators. Regional training has been conducted by most Regions. Multi-region training has been conducted jointly by NA and R-8 on specific pesticide-use subjects. National training has been conducted three times at Marana, Arizona since 1986.

#### 1. District

Instructors - Marana pesticide course graduates,  
qualified district people if available,  
FPM pesticide-use coordinators.

Students - District temporaries and technicians.

Subjects - Safety, efficacy, equipment, monitoring,  
pesticide storage, and disposal.

#### 2. Forest

Instructors - Pesticide-use coordinator (Forest and Region),  
FPM specialists.

Students - Pesticide-use coordinators.

Subjects - Safety, laws, NEPA, toxicology, calibration,  
pesticide labels, State and/or Federal certifications.

#### 3. Region/Area

Instructors - Graduates of national pesticide course, pesticide-use coordinators, FPM staff, university and state cooperators, and other specialists.

Students - FPM and other FS pesticide users, state cooperators, other federal cooperators.

Subjects - Federal and/or State certification training, NEPA, safety, laws, toxicity, calibration, and pesticide labels.

#### 4. Multi-Regional/Area

- Instructors - Graduates of national pesticide course, pesticide-use coordinators, FPM staff, university and state cooperators, and other specialists.
- Students - FPM and other FS pesticide users, state cooperators, environmental coordinators, other federal cooperators.
- Subjects - On-shelf equipment and products, current technology, hands-on training, spray system calibration and characterization, pesticide safety, general safety, air operations, basic pesticide-use management training, certification training, contracting, public involvement and risk communications, and instructor training. Each multi-region training program could emphasize training needs e.g. gypsy moth suppression, western defoliator, regeneration insects, or herbicide-use as examples.
- Remarks - Two or more Regions/NA could join forces to provide this training.  
Training location could be Marana or other location.  
Approach would be more economical than by having Regions go it alone.  
Each Regional course could emphasize e.g. western defoliators, eastern defoliators, and seed and cone.

#### 5. National

- Instructors - Individuals nationally known for their expertise.
- Students - International, federal, state cooperators, forest pest management specialists, and environmental coordinators.
- Modules - New Technology & Products  
Toxicology  
Risk Assessment  
NEPA - Legal Aspects  
Conduct Operational Control Projects  
Contracting Pesticide-use Projects  
ICS System  
Safety  
Aviation and Safety Management

Pesticide-use Management for line and staff  
Public involvement and risk communications

### National FPM Training Program

Future national training at Marana or other facility might be organized in a tiered structure as follows:

(Tiers)	(Examples)
Modules	Conduct of Operational Projects
Units	Vegetation Management Defoliator Control (Aerial) Ground Control (Seed Orchard)
Lessons	Planning Conducting Evaluation

### AVIATION SAFETY TRAINING

Dr. James O. Pierce and Dr. Richard K. Brown at the invitation of Bob Adams gave the committee a briefing on considerations for Forest Service aviation safety and training. A briefing paper was distributed to committee members. This paper will be used by the committee in preparing an FPM strategic training plan. Enclosed with these notes are follow-up letters from Drs. Pierce and Brown; and Phillip L. Sarozek, Managing Director of Southern California Safety Institute. These too will be considered in developing the strategic plan.

### RECOMMENDATIONS

The following recommendations were developed by the committee:

1. Maintain a National focused and facilitated pesticide-use training program and organize on a module (course) concept.

Action: Director, FPM through Steering Committee

2. Retain training goal - "To provide a forum for pesticide technology transfer".

Action: Director, FPM through Strategic Plan

3. Draft a strategic plan for national FPM pesticide-use training and submit it to the pesticide-use coordinators for their input and approval.

Action: Steering Committee

4. Place training as a topic on the national pesticide-use management meeting to be held 1992.

Action: Assistant Director, (PUM&C) FPM

5. Develop budget procedures for pesticide-use training.

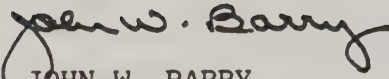
Action: Steering Committee

6. Survey alumni of past NARTC pesticide courses to determine how they have/are applying their training.

Action: Chairperson, Steering Committee

7. Appoint additional pesticide-use coordinators to committee.

Action: Director, FPM

  
JOHN W. BARRY  
Chairperson

Enclosures

cc: Attendees  
Members, National Pesticide Training Steering Committee



University of Southern California  
Institute of Safety and Systems Management  
Southern California Educational Resource Center  
For Occupational Safety and Health  
Los Angeles, California 90089-0021 • (213) 743-8983



May 29, 1991

James O. Pierce, Sc.D.  
Center Director, USC  
Industrial Hygiene  
Occupational Safety

Mr. Jack Barry  
USDA Forest Service-WO  
Forest Pest Management  
2121 C Second Street  
Davis, CA 95616

Judith A. Erickson, MSIH  
Sr. Program Administrator  
USC

Dear Jack:

Ramona Cayuela, R.N., M.P.A.  
Program Director  
Continuing Education  
USC

I would like to express my appreciation for being invited to participate and sit in on your Steering Committee's deliberations on training needs and requirements for Forest Pest Management. These discussions were very educational for me personally and I am very pleased to know that the USFS is so involved in strategic planning for long term training on its own initiative prior to such training being mandated by the Congress. It is my strong personal belief that the solution to reducing on the job accidents and illnesses is through appropriate and proper training of management and employees as to the potential hazards associated with the worksite.

B. Dwight Culver, M.D.  
Program Director  
Occupational Medicine  
UCI

William C. Hinds, Sc.D.  
Program Director  
Industrial Hygiene  
UCLA

I do want to apologize for the delay in writing to you, but upon my return from Albuquerque, I left for a week in Salt Lake City attending the Annual American Industrial Hygiene Conference where, incidentally, there were close to 9000 attendees! I did promise to give you a summary of the comments I made on Wednesday at the close of your meeting. So here they are:

1. I certainly agree with the comments made by Ken (Knauer) that training (at the National level) can't represent everything to everyone; it is not a practical nor cost effective approach, certainly not in one, course and probably not in multiple modular courses due, again, to the cost benefits/cost effectiveness aspect. On the contrary, an advanced pesticide management training course probably would be one which could be effectively given at the National level.

John M. Peters, M.D.  
Program Director  
Occupational Medicine  
USC

Mr. Jack Barry  
May 29, 1991  
Page 2

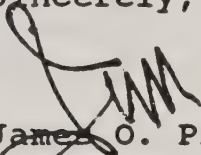
2. Regional training coordinated with National would be the best approach for specialized modular courses since there are geographical differences and concerns. It is imperative that the support and emphasis for health and safety training comes from the National Office to show strong administrative concerns for training requirements.
3. Safety and health training requirements should be directed all the way down the line from supervisors to the front line employees. There also should be mandated training requirements written in the contracts with State Cooperators with minimal requirements stated.
4. Training needs will require different emphasis in different regions based upon requirements. For example, populated areas are selected for spraying, there would probably be a need for training in dealing with public concerns, fears, and misconceptions.
5. I totally agree with the Steering Committee that a sound, well thought out, strategic and coordinated plan needs to be developed and an implementation schedule developed which identifies further subject areas and potential student groups.
6. Based upon my many years in academia, I find that an often ignored group who really needs health and safety training are the laboratory researchers themselves. Their biggest problem seems to be complacency in dealing with potentially toxic agents. The OSHA requirements for laboratory safety training are quite good and there are audio-visual materials available on laboratory safety.
7. Finally, I see a definite need for a comprehensive module on the safe and effective use of pesticides, herbicides, and rodenticides and training in personal protective equipment, i.e. garments and clothing. Special emphasis is required for respirator training and this training should be modeled after the OSHA respirator training requirements for respirator wearers.

Mr. Jack Barry  
May 29, 1991  
Page 3

I hope these comments will prove useful in some way to you. Also, as requested by either you or Ken, I am enclosing a copy of my resume.

If I can be of any assistance to you as you proceed with the development of a long term training strategy, please do not hesitate to contact me.

Sincerely,



James O. Pierce, Sc.D.  
Professor  
Director, Southern California  
Educational Resource  
Center for Occupational Safety & Health

JOP:dt  
Enclosure





MEMO                    Forest Service Albuquerque Meeting  
TO                      Jack Barry  
FROM                    Richard K. Brown  
DATE                    May 21, 1991

It was a real pleasure and opportunity for us to sit in on your training session in Albuquerque this week. Jim and I both enjoyed meeting you and the people of the Forest Service and to hearing about your concerns for training to enhance the eradication efforts you are pursuing.

Here are my observations on the meeting:

It was obvious that the attendees responded to the issues from their own perspective which is common to all meetings. It is difficult, therefore, to reach a consensus and/or standard. You have a distinct advantage in the steering committee, however, in that they all know what the problems are and you don't have to seek out that element.

As I stated there, I might be biased but professional trainers know that the "best" courses are those designed in house. This doesn't mean, however, that an outside agency is not an essential ingredient in that design and delivery. An outsider doesn't have the biases that those in the organization always have. Thus, they can be a catalyst to meld together the various concepts into an effective educational product.

What you were doing there was most familiar to me. What I have always tried to do is determine the "target"; the training needs of the audience, and then design the most appropriate vehicle to hit that target. That vehicle must include the right material and the appropriate level using credible instructors.

You did not discuss "feedback" which is a crucial ingredient in all training and should be programmed in at the discussion level. As in systems management, make sure the loop (learning) is complete by including the measures necessary to determine your success or failure in changing the students behavior.

We look forward to working with you on this project and believe that our particular expertise in aviation safety and industrial hygiene could be invaluable to you in resolving your training requirements.



# Primary Capabilities Listing

## Spring 1991

### Occupational Safety and Health

- Accident Investigation Techniques
- Environmental Impact
- Hazard Communication
- Hazard Material Incident Response
- Hazard Waste Training
- Hearing Conservation
- Human Factors and Accident Causation
- Implementation and Managing of IIPP
- Ionizing and Non-Ionizing Training
- Managing RMPP
- OSHA Compliance
- Personal Computer Based Management of Occupational Safety and Health Programs
- Personal Protective Programs
- Respirator Training
- Risk Management Protection
- Safety Management
- Systems Safety

### Aviation

- Aircraft Accident Investigation
- Aviation Safety Program Management
- Cockpit Resource Management
- Communications
- Gas Turbine Engine Accident Investigation
- Helicopter Safety
- Human Factors
- Passenger Safety
- Terrorism/Security

### Management

- Creating a Light Duty/Modified Work Program
- Developing an Effective Safety Committee Program
- Developing Emergency Action Plans
- Supervisor Responsibility Training

### Tools and Methodology

- Computer Awareness for Safety Professionals
- Computer Security for Safety Professionals
- Fault Tree Analysis
- Program Evaluation and Coast Assessment
- Program Management for Safety Professionals
- Risk Analysis
- Risk Assessment
- Risk Management

### Legal

- Aspects of Aviation Safety
- Aspects of Occupational Health and Safety
- Environmental Law
- Environmental Health and Safety
- Roll of the Technical Witness in Litigation

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### Specialized On-Site Training Programs

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SOUTHERN CALIFORNIA SAFETY INSTITUTE  
3858 Carson Street, Ste 210 - Torrance, CA 90503  
TEL: (800) 545-3766 - FAX: (213) 540-2612







**SOUTHERN CALIFORNIA SAFETY INSTITUTE, INC.**

June 4, 1991

Mr. Jack Barry  
USDA Forest Service-WO  
Forest Pest Management  
2121 C Second Street  
Davis, CA 95616

Re: Observations by Richard K. Brown, Ph.D., and James O. Pierce, II, Sc.D. on  
the USDA Forest Service meeting held in Albuquerque, NM

Dear Mr. Barry:

I wanted to take a moment to express my gratitude to you for the opportunity to introduce the Southern California Safety Institute (SCSI) to the Forest Service at Forest Pest Management Steering Committee meeting last month in Albuquerque. Also, I was pleased that the briefing that we prepared was of value to you.

Per requests from Dr. Knauer and yourself, Dr. Brown and Dr. Pierce have complied their comments and observations on those proceedings into the attached memorandum.

Under separate cover I will be sending to you a copy of the SCSI Mission Statement and Capabilities listing for your future reference. SCSI grew out of highly successful training programs developed and offered at the University of Southern California over the past 25 years. In fact SCSI was supported for the first 2 years by USC. We have continued that tradition of meeting safety needs by providing high quality professional training using faculty from academia, industry, governmental agencies and professional societies to provide you with the latest state of the art in the areas of Impact Statements, Needs Assessments and Training at all levels.

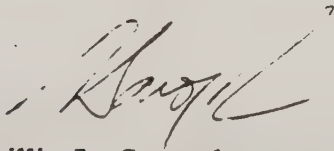
We feel that SCSI with it's unique blending of expertise in Aviation Safety, Industrial Hygiene, and Training Methodology, coupled with our trademark ability to tailor to the specific needs and applications of our clients any training programs, follow-ons, performance and evaluation matrixes, continuation training and related programs, could well be of value to the Forest Service in the development of these programs. And we look forward to being of future service.

Mr. Jack Barry/USDA Forest Service-WO letter, dated 6/04/91  
Observations by Dr. Brown & Dr. Pierce, Page 2

In the meantime however, if either myself, Dr. Brown or Dr. Pierce can answer any additional questions or provide any additional information, please do not hesitate to call us at (800) 545-3766.

I have forwarded a copy of this correspondence, with attachments, to Dr. Knauer at his office in Washington, D.C., and Bob Adams. If there are any others whom you would like a copy of this correspondence to, please contact me or my staff at the number listed above.

Sincerely,  
Southern California Safety Institute



Phillip L. Sarozek  
Managing Director

PLS/mf

enclosures

copy:           Dr. K. Knauer, Washington, D.C.  
                  Robert Adams, Randor, PA  
                  Dr. R. Brown  
                  Dr. J. Pierce  
                  Dr. P. Gardiner

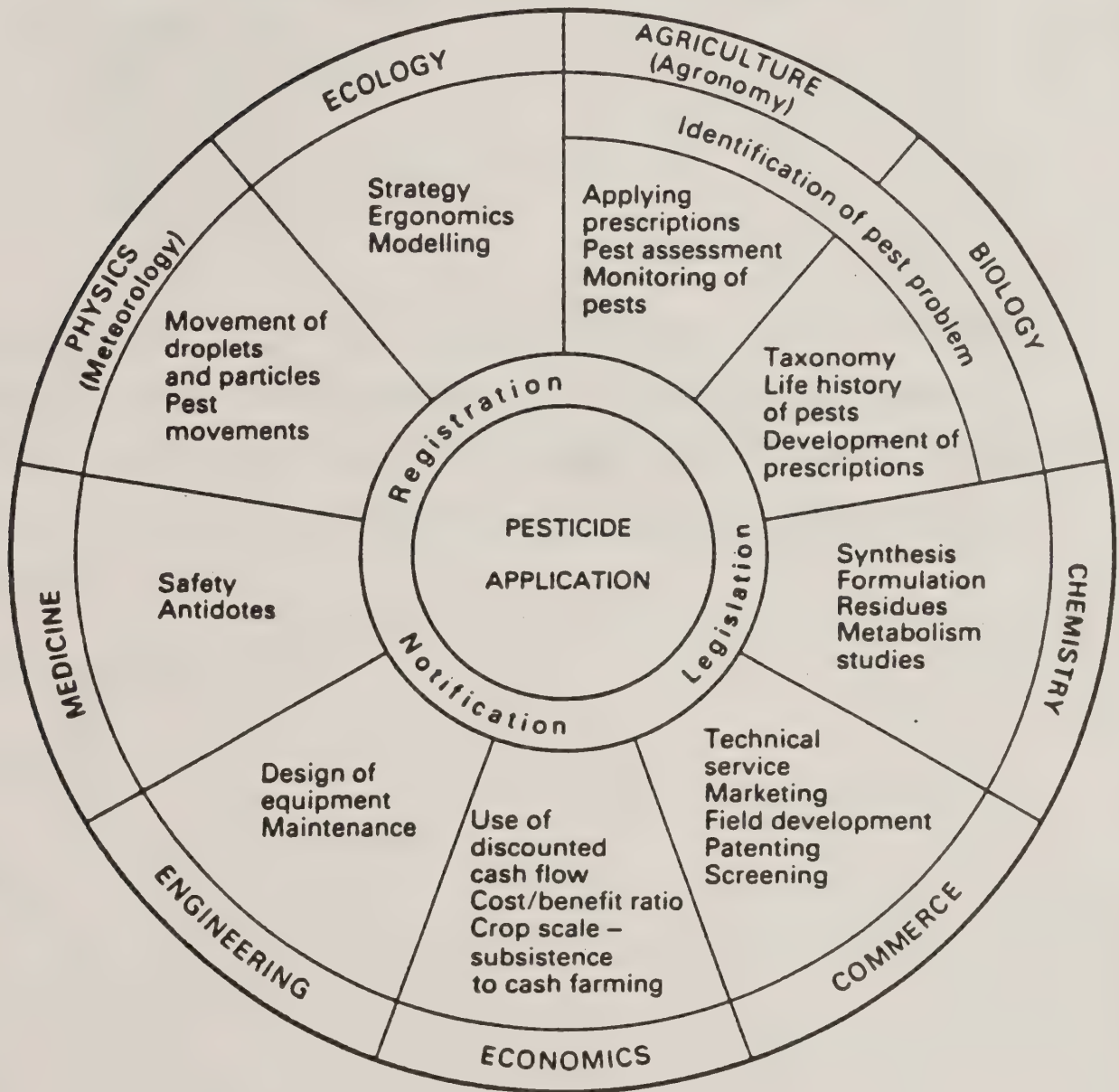
APPENDIX B

FUTURE PLANNING





Multidisciplinary nature of pesticide application.



Matthews, G.A. 1979. Pesticide Application Methods. London: Longman, PP 334.





United States  
Department of  
Agriculture

Forest  
Service

Washington  
Office

2121 C Second Street  
Davis, CA 95616

Reply To: 2150

Date: April 18, 1991

Subject: Potential Subjects for  
Future Training

To: Bob Adams, NA  
Roger Corner, NARTC  
Jesus Cota, WO/FPM  
Jed Dewey, R-1  
Harold Flake, R-8  
Fay Shon, R-6  
Larry Yarger, R-9

I would appreciate your comments before the National Advanced Pesticide Management Training Steering Committee meeting on the enclosed list of potential subjects or sub-courses that we might want to include in future training. The list will be discussed at our May 14-15, 1991 meeting in Albuquerque.

JOHN W. BARRY  
Chairperson

Enclosure



Caring for the Land and Serving People

FS-6200-28b(4 88)





## Pest Use and Management

### 1. Planning and conducting control projects:

Insecticide	National Forest lands	Organization
Herbicides	State & Private lands	Personnel

### 2. Contract administration - specifications, type of contract, and role of the contractor.

### 3. Environmental monitoring

Air	Water	Computer Models
Trees	Soil	

### 4. Risk assessment

### 5. NEPA process and documents

### 6. Aircraft operations, management, and safety

### 7. Pesticide - adjuvants, chemical, biological, semiochemicals, insect growth regulators, biorational, pheromones, (and other duplicating vocabularies)

### 8. Spray equipment - selection, use, calibration, capabilities, limitation, and sources

### 9. Weather - National Weather Service, synoptic and spot weather forecasting, mountain meteorology, weather effects on spray behavior, weather instruments

### 10. Monitoring quality of pesticide-use projects

### 11. Aircraft guidance, GIS, GPS, and block marking techniques

### 12. Pesticide application computer models

### 13. Sampling spray deposit and off-target movement of pesticides

### 14. Environmental fate of pesticides

### 15. Pesticide use in managing seed and cone insects and other regeneration insects

### 16. Safe use of pesticides and personnel protection

### 17. Litigation and appeals system

### 18. Vegetation management - biological, mechanical, cultural, and chemical methods



## Other Related Subjects

1. Risk communications - public involvement
2. Aerial survey techniques and remote sensing
3. Pest outbreak prediction models
4. Data analyses and presentation
5. Publications - articles, books, handbooks, manuals, journal publications
6. ICI System
7. Insect control strategies
8. Monitoring insect pests





5/8/91

Jack,

Sorry for being so slow at getting back to you commenting on your "list of potential subjects or sub-courses" for training. I can't seem to get ahead of things enough to get them done prior to the last minute. That's quite a list of topics. They range from very general, e.g. Monitoring Insect Pests, to very specific, e.g. Contract Administration.

From my perspective some of your topics are very interesting and would make good training courses. The ones I like most are:

- Planning & Conducting Control Projects
- Pesticide Use in Managing Seed & Cone and Other

Regeneration Insects

- Safe Use of Pesticides and Personnel Protection

These are the ones that I would either attend or send one or more of my entomologists.

Some of your topics are already being offered by the Regions, e.g. ICI Systems; Litigation and Appeals Systems; NEPA Process & Documents; Aerial Survey Techniques.

See Ya Next Week,  
Jed



JACK: HERE ARE MY COMMENTS TO YOUR 4/18 LETTER. (Larry Yarger)  
1991

Pest Use and Management

1. Planning and conducting control projects:

Insecticide  
Herbicides

National Forest lands  
State & Private lands

Organization  
Personnel

ALL THESE SHOULD BE COVERED. THIS TOPIC SEEMS CRITICAL TO IMPLEMENTING A SAFE PROJECT.

2. Contract administration - specifications, type of contract, and role of the contractor.

YES, THIS SHOULD BE INCLUDED. THIS IS WHERE WE SEEM TO ALWAYS GET QUESTIONS. ALSO THIS IS AN AREA WHERE SOME CREATIVITY CAN SAVE FS SOME DOLLARS AND TIME.

3. Environmental monitoring

Air  
Trees

Water  
Soil

Computer Models

JACK: I WASN'T AT THE LAST TRAINING SO I REALLY CAN'T SAY WHAT THE RESPONSE WAS TO THIS TOPIC. I WOULD SAY THE STUDENT EVALUATIONS SHOULD PROVIDE SOME GOOD INSITE INTO THE NEED FOR THIS TOPIC. TO ME, THIS IS A TOPIC THAT SHOULD BE COVERED.

4. Risk assessment

I'D SAY THIS TOPIC AND THE NEXT SHOULD EITHER BE DEVELOPED FULLY OR NOT AT ALL. I'M NOT CONVINCED THAT THE PEOPLE ATTENDING THE TRAINING SESSIONS ARE THE SAME AS THOSE RESPONSIBLE FOR DEVELOPING THE NEPA DOCUMENTS. I'D SAY LEAVE THESE TOPICS OUT AND FOCUS IN ON TOPICS THAT RELATE DIRECTLY TO IMPLEMENTATION OF PESTICIDE PROJECTS ONCE THE NEPA DECISION HAS BE MADE.

5. NEPA process and documents

6. Aircraft operations, management, and safety

DEFINITELY A MUST. LET BOB ADAMS SUGGEST WHAT WE NEED IN AVIATION MANAGEMENT.

7. Pesticide - adjuvants, chemical, biological, semiochemicals, insect growth regulators, biorational, pheromones, (and other duplicating vocabularies)

INCLUDE THIS TOPIC. INFORMATION ON THESE ALWAYS CHANGE AND WE CAN USE THE UPDATE.

8. Spray equipment - selection, use, calibration, capabilities, limitation, and sources

THIS SEEMS TO BE WHERE LOGISTICS BECOMES A PROBLEM, BUT HAVING EQUIPMENT FOR "HANDS-ON" DEMOS CERTAINLY SEEMS WORTH THE TROUBLE. I'D SAY THIS IS A GOOD TOPIC FOR MAY 14/15. WE NEED TO SEE WHAT THE STUDENT EVALUATIONS TELL US.

9. Weather - National Weather Service, synoptic and spot weather forecasting, mountain meteorology, weather effects on spray behavior, weather instruments

YES. A MUST. DEPENDING ON WHAT THE STUDENT EVALUATION SAY, WE MIGHT WANT TO GET JOE PEDIGO TO MODIFY THIS FIRST GO AT IT.

10. Monitoring quality of pesticide-use projects

YES. WE SHOULD PRESENT DISCUSSIONS ON WHAT LEVEL OF MONITORING IS APPROPRIATE FOR WHAT TYPE OF PROJECTS IN WHAT TYPE OF LOCATIONS HAVING WHAT TYPE OF ENVIRONMENTAL ELEMENTS (T&E SPECIES, SURFACE WATER, SEASONAL STREAMS, ETC.). ALSO DISCUSSIONS ON MITIGATION MEASURES TO MITIGATE POTENTIAL EFFECTS TO THESE ELEMENTS/AREAS. I'D GIVE THIS TOPIC HIGH PRIORITY!

11. Aircraft guidance, GIS, GPS, and block marking techniques

INCLUDE THIS TOPIC.

12. Pesticide application computer models

YES. NEW TECHNOLOGY (ADVANCED TECHNOLOGY).

13. Sampling spray deposit and off-target movement of pesticides

YES. THIS TOPIC GOES ALONG WITH #10 ABOVE. TO ME THIS IS A HIGH PRIORITY TOPIC.

14. Environmental fate of pesticides

SEEMS TO ME A GENERAL DISCUSSION ON THIS WOULD BE VALUABLE, SUPPLEMENTED MAYBE WITH SOME HANDOUTS ON SPECIFIC PESTICIDES. LOTS OF INFORMATION IN FS BACKGROUND STATEMENTS. NOT SURE HOW MUCH WE NEED TO GET INTO THIS TOPIC. THIS IS A GOOD TOPIC TO BAT AROUND IN ALBUQUEQUE.

15. Pesticide use in managing seed and cone insects and other regeneration insects

SEEMS WE ARE TALKING DIFFERENCES IN APPLICATION TECHNIQUES AND MAYBE SOME PESTICIDES. WE COULD HANDLE THIS IN OTHER TOPICS RATHER THAN ADDRESSING THIS AS A SEPARATE TOPIC. WE'D HAVE TO SEE HOW MUCH INTEREST THERE WAS ON THE PART OF THE REGIONS FOR THIS TOPIC TO BE SPECIFICALLY ADDRESSED.

16. Safe use of pesticides and personnel protection

DEFINITELY. A MUST!

17. Litigation and appeals system

DEFINITELY NO! UNLESS WE FULLY ADDRESS NEPA, THEN WE WILL NEED TO ADDRESS TWO AUDIENCES: THOSE WHO WANT THE TECHNOLOGY AND THOSE WHO WANT THE ADMINISTRATIVE END (APPEALS, NEPA, ETC.). LET THE REGIONS/AREA WITH THEIR OGC COUNSEL HANDLE THIS AREA.

18. Vegetation management - biological, mechanical, cultural, and chemical methods



DEFINITELY YES! WHY NOT?? REGIONS CERTAINLY SPENT ENOUGH DOLLARS TO GET THE NEPA PROCESS ADDRESSED.

### Other Related Subjects

1. Risk communications - public involvement: I'D SAY YES, ESPECIALLY TO THE EXTENT THAT ON-SITE PROJECT MANAGERS NEED TO HAVE SOME SKILLS IN ADDRESSES PUBLIC INQUIRIES, NEWS REPORTERS, ETC.
2. Aerial survey techniques and remote sensing: NOT SURE WHAT IS MEANT BY THIS TOPIC. SOMETHING TO DISCUSS IN ALBUQUERQUE.
3. Pest outbreak prediction models: NO
4. Data analyses and presentation: YES, AS LONG AS THE DATA RELATES TO THE ACTUAL PROJECT ACTIVITIES. I CAN'T SEE WHY WE 'D ADDRESS POPULATION MONITORING IN A PESTICIDE WORKSHOP.
5. Publications - articles, books, handbooks, manuals, journal publications YES, AS THEY RELATE TO PESTICIDE PROJECTS.
6. ICI System: YES
7. Insect control strategies: NO! I'D LIKE TO SEE FUTURE WORKSHOPS BE DEVOTED TO PESTICIDE APPLICATION, MONITORING, PROJECT PLANNING, ETC. RATHER THAN GET INTO STRATEGIES FOR SPECIFIC INSECTS, IF THAT IS WHAT THE QUESTION REALLY IS. SEEMS WE NEED TO FIRST REDETERMINE THE OBJECTIVE OF THE TRAINING SESSION. SOUNDS LIKE THERE MAY BE SOME INTEREST IN WIDENING THE SCOPE. I'D ADVISE AGAINST THAT. IF WE CAN, LETS NARROW IT SO WE HAVE A FOCUSED AUDIENCE, AND MAYBE REDUCE THE NUMBER OF DAYS FOLKS ARE AWAY FROM THEIR WORK LOCATIONS. WE MAY GET MORE INTEREST IF WE REDUCE FROM 2 WEEKS.
8. Monitoring insect pests: NO!



APPENDIX C

SUMMARY - STUDENT COURSE EVALUATIONS





NATIONAL ADVANCED PESTICIDE MANAGEMENT TRAINING  
FEBRUARY 18 - MARCH 1, 1991  
MARANA, ARIZONA

SUMMARY OF THE STUDENT COURSE EVALUATIONS

Sixty-six students attended the course, one of whom had to leave early. Of these 50 completed student course evaluations and turned them in at the conclusion of the course on March 1.

There was a great deal of diversity in the students. Fifteen students were women. They came from all sections of the United States. Students also came from Canada, Mexico, and New Zealand. Most students were Forest Service employees. Other federal agencies represented included the Bureau of Indian Affairs, Bureau of Land Management, U.S. Environmental Protection Agency, U.S. Air Force. Students employed by state agencies and one private corporation participated. Pesticide knowledge and experiences were highly varied.

Overall, the students rated the course and individual presentations by instructors very favorably. Evaluations of individual presentations by the faculty are at NARTC. A high percentage of the student responses indicated they felt the course content supported the course objective. However, many expressed the feeling that the course objective should emphasize design and management of pesticide projects rather than be used to train a cadre of personnel who could train others. A comment made frequently was that although most of the training was advanced most aspects of pesticide management were not covered in sufficient depth for the students to consider themselves expert enough to take on the responsibility of training others as a result of having attended this course. Many of the students attended the course to better equip themselves to design, conduct, work on, and administer pesticide projects.

Based upon analysis of students evaluations of individual presentations and the course it is evident that the majority, but not all, wanted to take away a good dose of practical knowledge on pesticide use. A significant number of the students did not respond favorably to the more theoretical presentations, especially material on monitoring. If they could see practical use for the information the students tended to react positively. For most students the exposure to equipment at the airstrip was a sought after experience, particularly where they got to see it in action and work out problems.

Very few of the students commented on the optional evening sessions, probably because they were not asked to evaluate them. All of the sessions were well attended and most of the students and faculty stayed for the entire presentations. Generally there were several questions posed to the presentors. This is interpreted to mean that the evening sessions were viewed favorably by the majority of those who attended them.

SUMMARIZATION OF STUDENT RESPONSES FROM COURSE EVALUATION FORMS

The course objective as stated in the course brochure was as follows: Upon successful completion of the course, the attendees will be able to provide Region and Area pesticide-use training and conduct quality pesticide projects using state-of-the-art technology."

1. Did the content of this course support this course objective?	Yes 24	Most of Time 21	No 5
--	-----------	--------------------	---------

Many students felt the course or individual presentations did not meet the objective of training trainers and suggested that course planners evaluate if this should be retained as an objective. A relatively small number of students felt that the course was not sufficiently advanced. For them, too many subjects were presented and that meant that most could not be covered in the detail necessary to earn a label as advanced. Several students did state that as a result of the course they did feel qualified to design, work on, and manage pesticide projects. Several students commented that not enough emphasis had been placed upon ground application pesticide projects. Many students provided comments about the excellent sources of references and information provided.

2. Did instructors demonstrate how lessons relate to practical situations?	Yes 17	Most of Time 24	No 4
--	-----------	--------------------	---------

As seen in the mix of responses, it was clear that not all instructors were successful in relating their material to the "real world" as perceived by the students. Many students provided negative comments about the theoretical presentations on pesticide monitoring and felt there seemed to be little of practical value in several of those presentations. They were looking for specific monitoring techniques and specific advice, such as how many samples to take, how to take them, and even why they should take them. Instructors who told "war stories" based on actual experiences that had a practical message for the students generally got high ratings. A majority of students remarked that the second week was of more use than the first because they perceived it provided more practical information.

There were a few students who commented the training needs to focus on National perspectives and that regional differences or perspectives should not dominate the course or individual presentations. If it is important to emphasize regional differences then specifically mention this. A lot of the material presented had a Southern and Pacific Northwest flavor. Do not ignore other parts of the country. Too little attention was paid to small scale projects, need to provide information for ground applications, small aerial projects, small acreages and small budgets. Several students suggested it would be valuable to use actual case histories of past pesticide projects ranging in size from small to high. They felt this would provide an excellent source of down-to-earth practical information.

The presentation on the CREAMS/GLEAMS models was subject to many negative comments, all based on the students perception that the material as presented did not seem to have practical application. Presenters need to state how their material is to be used.

The field exercises at the airstrip were commented upon favorably by many of the students. They felt that the presentations provided them with information they could use. However, there were several comments about not allowing sales



representatives to pitch their particular products. The students liked the student group problems, some suggested they have more. There were several comments about not liking to sit listening to lecture material for 8 hours, try to break it up by having them do something other than just listen.

3. Did instructors use class time well?	Yes	Most of Time	No
	10	35	5

There were numerous comments that many of the instructors rushed their presentations, and that they tried to present too much material within the time they were allotted. Need to carefully determine how much time is needed for each presentation in order to present the important information. Good lecturers were very obvious and appreciated. Important to practice or dry run the lectures and particularly the laboratory exercises to get the right timing and pace. Make sure everyone knows how to use the audio video equipment so they don't fumble around. Some students indicated they felt some of the lab material did not have practical value, such as assembling air monitoring devices. Do not set up schedules that do not allow every student to visit each laborator or demonstration station. If it is important enough to set up then every student should have the opportunity to get involved.

4. Was adequate time allotted for questions and answers, discussion and interaction?	Yes	Most of Time	No
	17	19	14

This evaluation point is directly related to the previous one. As seen in the student responses many students did express opinions that there is room for improvement in this area. Many students responded that although there was a lot of material presented most had their questions answered. It was good to have the faculty around after the presentations for discussions.

Many students commented specifically and favorably about the high degree of organization that was required to keep the course on schedule and flowing smoothly.

There were several suggestions offered to improve upon interaction. Allow 1/2 hour early in the session to assign student problems and have the groups meet. Provide more time for everyone to introduce themselves the first day, including their pesticide background and responsibilities. Allow time to discuss actual past pesticide projects. Have evening sessions where the day's faculty would be present to answer any questions. Get all instructors in a section together at the end of each section for wrap-up, this was done for some sections.

5. What topics do you believe should have been given more time/less time?

More time:	Safety (5)	Less time:	Monitoring (14)
	Efficacy (3)		CREAMS/GLEAMS (5)
	Project design and mgt		Adjuvants (3)
	(case histories) (6)		Individual products (2)
	Ground application (7)		Weather basics (2)
	SwathKits (4)		
	Monitoring specifics (3)		
	Risk analysis/communication (2)		
	Field demos/exercises (3)		

Biological pesticides/controls (2)  
Student group problems (4)  
Alternatives to pesticides  
Toxicology (2)  
Contracting

6. What course materials do you believe should be available for reading prior to attending the course?

A majority (29) of students responding to the course evaluation believe as a practical matter that no reading material be available prior to the course because they do not have time to read it.

Students who did respond positively to this suggested the following:

FSM 3400  
FS policy on pesticide monitoring  
Pesticide safety, "safe and effective use of pesticides"  
NEPA regulations pertaining to pesticides  
NARTC information, facilities  
Tucson and local area, Tucson visitors guide  
Aircraft safety  
List of acronyms  
1 paragraph summary of each presentation

7. What other recommendations would you make regarding course content to enable us to better serve the needs of agency administrators? Are there other topics or units which you would like to see included in the course?

1. Case histories of actual projects to discuss and evaluate to see how it was really done.
2. Designing, planning, organizing, and conducting pesticide projects.
3. Start the classes at 0730 and let us out no later than 1630 to allow time for exercising.
4. Run concurrent classes for herbicide and insecticides.
5. Legal obligations pertaining to pesticide use.
6. Do not focus so strongly on the South and Pacific Northwest.
7. More on safety.
8. More on ground applications.
9. Have separate sessions for aerial and ground application.
10. Include contracting
11. Drop chemical representatives
12. Lots more doing, hands-on activities for the students.
13. More time for the student group problems.
14. Video-tape some of the presentations.
15. Check closely to avoid repetition of material.
16. Provide name tags with duty station.
17. Schedule cardline flight earlier so if weather turns bad can reschedule.
18. Let class out by 1630 on the first Friday.
19. Reduce the number of faculty.
20. Do do joke or make light of pesticide effects.
21. Avoid impression we are aligned against environmentalists.



APPENDIX D

FACULTY EVALUATIONS,  
COMMENTS, & NOTES



JAMES S. HADFIELD

served in the role of course evaluator for this course. I tabulated the student and faculty evaluations and analyzed overall course evaluations prepared by the students. A report was prepared and submitted dealing with analysis of the student evaluations. This constitutes my personal observations and recommendations.

I believe the Forest Service should make a commitment to establishing a small number of truly expert pesticide application teams, especially for aerial application of pesticides. We should take a close look at the fire suppression teams within the Forest Service and develop a parallel organization or capability. We should have a very small number (probably no more than 3) of national, or even international, level pesticide application teams. These teams would be very highly trained and be capable of dealing with practically any aerial pesticide application project anywhere in the world. They would be well versed in the theory of pesticide application and have hands-on-experience in application. Similar to fire suppression, when there was a need for a national level pesticide team's expertise the teams would be activated and dispatched to the project. I believe this would demonstrate the agency's commitment to conducting pesticide application under the highest degree of professionalism. It would also allow the agency to respond quickly. My recommendation is to focus future Marana pesticide training at this level.

National level teams could take on the responsibility of training regional or project level personnel in pesticide management and application.

I have several specific comments pertaining to the 1991 session.

There was a very wide disparity in the pesticide backgrounds and responsibilities of the students. This ranged from some with absolutely no previous experience to those with more than 15 years. If the intent is really to conduct an advanced course then the students need to have previous training and experiences in pesticide management.

I believe that a majority of the students attended to get hands on training that would prepare them to go back and actually work on pesticide projects. I feel that much of their training needs could be better met at the regional level if regional level training was available. In that regard the type of training put on by R-5 in 1990 in anticipation of resumption of herbicide use, would meet most students needs better than a national course.

There were too many topics and too many instructors. (I am not sure I want to know how much the course cost.) This was a result of trying to cover as many aspects of pesticide management as possible in two weeks. However, this had the effect of not being able to present any particular facet of pesticide management in real depth. Again, look at how Fire Management does their advanced training. They take a rather narrow subject and then devote a lot of effort to it to develop expertise in the students, we need to consider a similar approach.

I suggest that video tapes of several of the topics presented at the 1991 course could be developed that would sufficiently meet the needs of many of the students.

It is my impression, after having attended two Marana sessions that there is not much common ground between insecticide and herbicide people, at least as represented by the students present. If the intent is to continue to provide national pesticide training to a large number of people, rather than develop a small number of truly expert teams, then I suggest having separate or concurrent sessions dealing with insecticides and herbicides. There is a similar split between ground applications and aerial applications, but this is primarily within the herbicide faction.

The faculty should have been asked to evaluate the course. There was a tremendous amount of expertise present in the faculty. I believe many good ideas would have surfaced from this group had they been asked to evaluate the course as a whole.

All things considered, I believe Marana is a good place to do this type of training. The classroom facilities are top notch. The staff at Marana does an excellent job in all aspects of course management. Being a captive at the facility actually is beneficial because there are few distractions to disrupt training.

I heartily endorse the approach suggested by many students that actual pesticide project case histories be used as part of the instruction. I believe it is good to learn from what actually worked and what did not work worth a hoot. I would back off somewhat from the theoretical approach unless the agency buys into the concept of the national expert teams.

Nit-picking comments. Avoid long periods of lectures without having students doing something. Make sure instructors meet NARTC standards of material presentation. Choose speakers who can speak effectively and get their message across. Make sure instructors know how to use the equipment. Allow time at the end of each day for questions and discussion. Do not allow technical representatives to pitch their product. The section unit leaders should try to have their presenters avoid repeating or contradicting each other. Avoid domination of the course by any particular region of the country. Do not tolerate sarcastic comments about zapping opponents with pesticides.



## PESTICIDE COURSE CRITIQUE

Prepared by: Julie Weatherby  
February 18 - March 1, 1991

I feel we have made definite strides and have improved upon the first two courses. Improvements include:

- 1) Quality of the instruction. In general I believe the quality of instruction has improved. Even though many of the non-FS speakers may be expensive, I found most of them to be very effective. I would discourage the use of industry representatives unless we have a firm commitment that they won't give a sales pitch. The key is to identify good instructors, people who can teach.
- 2) Small group instruction. Despite the logistical problems created by the small group approach I believe small groups are the most effective approach. The interactions between students and instructors were great. For lab situations small groups are much more effective because everyone can hear, see demonstrations, and participate.
- 3) Effective mix of classroom and field exercises. This was the first course where we made a concerted effort to disperse field exercises throughout the course. At no time was any group in the field longer than half a day - any longer is counter-productive. On the other hand students get mesmerized if they have to listen to lectures all day.

Suggestions - I still feel we need to better identify our intended audience and to communicate to the field who the course is designed to benefit. Perhaps we could rework the flyer and include a subject outline of materials to be discussed. In my opinion the course is too broad in scope. Perhaps we could develop a more modular approach or break this course up into a series of courses. If we choose to do this we need to identify the audiences i.e.: those interested in insecticide projects; those interested in herbicide projects; those involved in small acreage hand applications; those interested in aerial applications; those interested in on-the-ground project work; those interested in mid-management project organization; those interested in environmental monitoring; etc. I believe most people attending this course will not be conducting large training sessions. They may be involved in on-the-job training. Most people are here to better their own understanding so they can be better prepared to participate in pesticide application projects.

If we develop a carding system to identify personnel available for pesticide projects perhaps, we could identify courses or modules which would be required in order for individuals to qualify for specific jobs.

The workbook was not as effective as it could have been. Not all instructors submitted materials to be included. Some instructors did not structure their field exercises as a hands-on exercise in a problem solving format. I suggest

that we continue the workbook idea. I would like to see students more involved in actually solving problems on their own. We need to turn them loose to solve these problems. That is really the only way the students will know or we will know if they are really capable of solving real-life assignments. If we used the workbook as a series of work sheets that could be collected and/or discussed later in a small group discussion, I think the students would learn more. We need to present the concepts in lectures and structured labs and then we need to give them free time to solve problems on their own.

Should we continue to conduct this training course or a modification of such a course? I really feel there are benefits in a National Course(s). The interaction is very good. Those people involved in the organizational aspects of the course spend tremendous amounts of time. The demands impact their jobs perhaps more than most people can afford. I'm not sure how to solve this problem. For the most part NARTC does a good job. Often times they have to wait so long for the instructors to submit their lesson plans, etc. that there is not enough time for NARTC to prepare class materials. I returned an edited version of my lesson plan but the corrections never made it into the notebook. There were several mistakes on slides which probably could have been prevented if instructors could have previewed them prior to the course.

Attendance at the faculty work session is critical. I think the faculty session should be more structured. Announcements and deadlines should be made clear to the entire faculty. Meetings for sub-committees, i.e. field exercises, should be scheduled during free time and not when other things are scheduled. I think we should contract the entire course, but then we run the risk of having courses which are not suited to FS or government policies.

- Ideas - 1) Perhaps we could have a module where a small group of students could visit a pesticide project and with a discussion leader they could observe and discuss various aspects of a spray project.
- 2) We might try identifying the modules in the call for nominations and nominees could select modules of interest to them. We could have a basic core course which everyone would take before breaking down into modular courses.



To: Jesus Cota, FPM, Chief's Office. Unit Leader, Unit IV

cc: Jack Barry, FPM, Davis, California

From: Dave Thomas, Eldorado National Forest, Assistant Unit Leader, Unit IV

Subject: Critique of 1991 National Advanced Pesticide Application Training,  
Marana, Arizona, February 18 - March 1, 1991

First, most of my comments reflect my observations made during the two week course, although I didn't have many opportunities to actually attend many of the classes. Also, my comments reflect comments that many students and faculty passed on to me during the two week session.

I do plan on attending the steering committee meeting in Albuquerque on May 14 and 15, and will again reiterate my comments.

First, I think overall that the 1991 course was the best of all the courses held in the past. I would overall rank the 1991 course as "excellent", and pass on a "job well done to everyone involved!!!!". It was alot of work on the part of the cadre, but all of the hard work was very evident to the students.

As Jack Barry has already told us in his letter to the cadre, I too appreciated the fact that eight members of the faculty (out of 57 total faculty) remained in Marana for the entire two week period. I was, however, disappointed that more of the faculty did not stay for the duration of the course.

General Comments: Overall, I felt, as did the students, that Unit II, Monitoring, was too long and too detailed for a course of this nature. I feel that some of the time spent in "monitoring" could have been better spent in the other units, such as Unit IV. Some of the lectures and demonstrations in Unit IV didn't have enough time for the instructors presentations. Stewart Craig's presentation on "ground application equipment" is a good example.

The support we received from the personnel at Evergreen Air Center was excellent. Also, Roger Corner did an excellent job of coordinating all of the massive amounts of equipment and visual aids that were shipped to Marana for this course.

I felt that it was unfortunate that only about 6-7 members of industry participated in the "trade fair", although I think that those that did attend did an excellent job!

Comments on Unit IV: Overall I would rate Unit IV as a tremendous success...excellent coordination on the part of all faculty involved. I think that a little more coordination between Unit IV and Unit V could have occurred. A good example was the characterization trial that was suppose to be held on Thursday morning, but was cancelled due to rain. No one informed me that they were going to attempt the trial later, and I had already made the decision to dismantle the aircraft. Not really a large complaint, but something to keep in mind for future sessions.

I hope that the Washington Office intends to utilize the two demonstration spray stands that were constructed for this course. University of California at Davis did a very nice job in constructing the stands and they were an excellent visual aid and an excellent training aid. A little more work needs to be done on the stands to make them fully operational as a training aid. I would volunteer to complete this task. I will need additional funds to complete this task. I will provide a cost estimate during the May meeting in New Mexico, but would guess in the neighborhood of \$500.

I really don't have any more specific comments, as I previously mentioned, I was unable to attend many of the lectures. Overall, I thought the course was a tremendous success....the best ever!! Everyone involved deserves a congratulations and thanks for a job well done!!!



Jack,

Since I can't attend the meeting in Albuquerque because of a conflict (I must be in Alaska that week for the aerial application of MCH) I want to take this opportunity to provide a few comments for you and the committee. By almost any measure you want to use, the comments I received about the course indicates that this effort far surpassed the previous course in many respects....complexity, broad based coverage, organization, level and quality of presentation (regardless of whether neckties were always worn) and student/instructor interaction. I have also read over the course and faculty evaluations and it is my opinion that they will support the above conclusions. I would caution the committee to evaluate the student forms very carefully. Positive reviews (no matter how tepid) with constructive critical comments are far more important than negative reviews with no constructive critical comments or destructive critical comments. University studies concerning instructor evaluation forms have shown that students who know they are getting a poor grade or students that simply do not like the subject matter will invariably denigrate an instructor regardless of whether that instructor is presenting material in a competent and interesting manner. Therefore, I think it is especially important to pay particularly close attention to those positive comments.

Concerning the question of parallel insecticide/herbicide subcourses within an overall Marana type course. I caution the committee about this since the course organizers and faculty could be face with a real tilt toward the herbicide interests. This could result in 30 in the herbicide subcourse and 15 in insecticide subcourse. Further, I really do feel that these people should be exposed to a broadbased subject matter regardless of whether their primary interest is herbicide or insecticides. I think the insecticide/herbicide subcourses is a workable format but still I am hesitant to recommend it.

#### Suggestions for present format

Unit 1--- Revamp this sections as follows

Pesticide/ Adjuvant Classification	.5 hr
Herbicide Adjuvants	.75 hr
Insecticide/Microbial Adjuvants	.3 hr
Pheromones	.3 hrs
Discussion	.15 hrs
	<u>2 hrs.</u>

Although this is an important unit since it sets the stage for the rest of the course entirely too much time was provided to cover the subject. We could accomplish the same objective and cut it to 2 hrs. On other subject relating to this unit I was taken aback by several student comments that this section, particularly the pesticide classification sections was too advanced. We need to do a better job of screening students or provide them with a precourse package that reviews basic pesticide classification. This would at least expose the very uninformed to the nomenclature used etc.

Unit 2 (Lt.Col John Taylor, Sir, will love me for this)

This unit needs to be revised drastically. Not that it was poorly organized, presented etc. It was simply too long.

My recommendation

Keep A,B,E,G,H,K as is.

Alter the following:

- C- 1 hr. No lab. Incorporate the equipment etc., into lecture.  
Excellent information but lab got too detailed.
- D- 1 hr. 1 hr lab. Again the lecture got too detailed and was not retained by the students.
- F- delete and substitute 1 hr of Risk Assessment- I recommend Ed Monnig from R-1. Maybe even a lab would be good here.
- I- 1 hr NO lab. Incorporate methodology and sampling equipment into lecture.
- J- 1 hr No lab. Rewrite lecture etc., to more fully describe techniques and objectives.

Insert lecture on Good Laboratory Practices. 1 hour.

The above recommendations reduce time committed to this section by about 6 hrs.

Strongly recommend keeping the schedule and organization of the field and airport sections as is. It worked!!! So leave it alone.

Somewhere we also need to work in a more thorough discussion of pheromones and other new insect control agents ie IGR's, juvenile hormones and their mimics etc.

Although I dislike being imprisoned at Marana there are too many advantages to holding a course like this elsewhere. Suggest starting at 7:30am and ending everyday at 4:30pm. This would allow students and faculty to relax, jog etc., before going to dinner. Provide for free night-- nothing going on but visit with colleagues etc. Provide for a debate/panel discussion with planned controversy to enhance interests.

Lastly I recommend keep the steering committee in existence and begin planning for the next course (2-3 years from now) within the year.

Patrick J. Shea

Principal Research Entomologist

Pacific Southwest Forest and Range Experiment Station

Berkeley, CA 94701

Jack,

In reference to your suggestion at Faculty Meeting regarding visiting with students at meals, etc., I've done so at most meals, and have been able to digest a few useful points:

1. The organization of the course, administratively, is like a well-oiled machine. Superb.
2. The technical organization is generally good, but a couple of points keep surfacing that might be worth your attention.
  - a. The technologies of insecticides and herbicides and insecticides are very different, both conceptually and practically. There may be some sentiments suggesting that there are some generic concepts, such as adjuvants and spray physics and behavior of substances in the physical and biological environment, which should come first. For monitoring and application technology, they might be segregated distinctly
  - b. There is a pretty common thread that monitoring is offered at a research level, where as these folks need guidance for day-to-day operations. I can see their point, yet they need to see where the concepts come from. How would it be to give some thought to condensation of the research background, then have a really broad person (experienced in both field and research use) give some practical approaches to monitoring. There are obvious needs to monitor, both legal and practical. Very little of the monitoring needs to involve analytical chemistry. and I've heard some real horror stories of inappropriate stuff these few days. I can probably help more in discussing this with you personally than just by delivery of this note.
  - c. Somewhere early in the program I wonder about a session or two at
    - 1) formulating goals and criteria for managing with pesticides,
    - 2) writing EIS's and EA's so that goals and criteria are articulated clearly as bases for alternatives, and
    - 3) a wrap-up so that operations and monitoring are directed toward those goals and criteria.

There is some confusion, maybe a lot, about what sort of yardsticks are useful for monitoring. There aren't any unless they are stated qualitatively and quantitatively in the goals and criteria. I sense that these folks haven't been able to sort these out of what they've heard.

Mike Newton  
2/22/91  
Marana, AZ







Jack,

The instruction on monitoring has been very good. Technically, the speakers have focused on methods, patterns of behavior and basic components of a good pesticide behavior research program. All well and good, but I wonder if we haven't spotted an opportunity to add something, i.e. what is a pesticide - specific impact, and when is it part of the plan and how do we determine whether it is undesirable or "unreasonable", the EPA lynch pin, in the operational framework? Would talks on (a) basics of biological responses (toxicology), e.g. by Frank Dost, (b) responses of ecosystems to pesticides in the context of other management disturbances, and (c) impacts of management without pesticides be a good supplement to Sections I and II of this program?

I think some of the program time could be gotten by pooling the two talks on adjuvants, and part maybe by shortening the allocation to monitoring. If Dost were to handle topic (a) above, I could handle (b) and (c) if all this seemed a good idea.

For your consideration.

Mike Newton  
2-20-91

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Note: Comments by Mike on the 1991 National Advanced Pesticide Management Training course at Marana, Arizona.



To: Jack Barry

Date: April 2, 1991

From: Tim McConnell, Characterization Unit Faculty

Subject: 1991 National Advanced Pesticide Management Training  
Marana, Arizona

Dear Jack,

First, I'd like to say thanks for the opportunity to be a part of this year's NAPMT course. What a huge undertaking and challenge for you and the unit leaders. I now realize the amount of work effort and time that is required to conduct a course of this magnitude. Pesticide management is such large subject to cover, especially when the students are from a varied background, each with their individual interest areas. The course is an excellent example of Forest Pest Management leadership nationally.

To attempt to meet course objectives and meet the needs of the students, as well as the needs of pesticide management nationally, a single 9 day course requires compromising some subject matter. Not everything can be covered, so then what subjects should be covered and to what extent?

One difficult area is the steering committee's advanced decision on subject matter of the course prior to student selection. The decisions must be done well ahead of time, but the students specific interest areas could be different. It seems to me that the 1989 NAPMT course leaned toward big bug spray projects, but a large portion of the students were interested in herbicide management training (even though slightly premature on their part). And the 1991 NAPMT course leaned more toward herbicide management, but large portion of the students were looking for information about insect spray project management. I would venture to guess that if herbicides are not to be used on federal lands in the west that the next student group interest will again lean towards insect spray projects. Which is my point, how can the steering committee determine students interests at such an early date?

I feel that the course still should cover both the herbicide and insecticide portions of pesticide management since both share many common methods, delivery systems and environmental concerns. Perhaps two different courses could be conducted for each of the two primary areas with an overlap in the middle that covered common delivery systems. Each course could be heavy in interest areas and light, but thorough, in non-specific interest areas.

I think it is important for the long term interest of Forest Pest Management that although most entomologists have little short term interest in herbicide management they have the opportunity to develop their understanding of all aspects of pesticide management. And vice versa for the herbicide managers. Much of today's pesticide management technology is shared by both areas and can be combined in a course, but it might suit the students better to attend portions of the training, as well as ease the pressure to have the entire faculty present the entire two weeks.

/s/ Tim





Reply To: 3400

Date: April 2, 1991

Subject: National Advanced Pesticide Training

To: Jack Barry

The response from R-8 cooperators and Forest Service personnel who attended the National Advanced Pesticide Management Training has been very favorable. The most frequent comments have dealt with how well the course was organized and structured. Many students have commented on the overall quality of the instructor cadre and their exuberance. Additional positive comments received have been on the quality and quantity of the course and reference material provided and the excellent class room facilities. In summary, the comments from R-8 are very favorable.

Students have made several suggestions that we may wish to consider. They like the "hands-on" activities and would like more of this type of training. One suggestion was to do a complete hands-on calibration and characterization on an aircraft in a field exercise. Concurrent class sessions we suggested for some of the insecticide and herbicide presentations. A few students commented on the models for environmental fate and felt the presentations were too detailed. I specifically asked our cooperators if the session was too long. To my surprise, they thought it was the right length with the amount of material presented.

I have some concerns with Unit VI-Evening Sessions. Are we asking and expecting too much from the students who have already spent 8 hours in the class room? When we invite speakers and go to the expense to bring them to Marana, we have to be assured of an audience. With the evening sessions we need to minimize competing activities. I don't believe the sessions would be well attended at a site other than Marana. Attendance at the evening sessions ranged from 25 to 60 percent of the students and faculty present. The students I spoke with who attended the evening sessions said they looked forward to something to do in evening and found the information valuable.

The 1991 session was much better than the 1989 session. The session was well organized and the quality of instructors excellent. In the next session, some time should be spent on spray project organization and implementation. Also, we should spend some time on NEPA requirements and interagency coordination. Overall, the session was excellent and several state cooperators have stated a desire to send folks to the next session.



HAROLD FLAKE  
Aerial Application Specialist

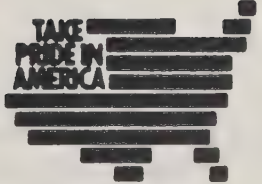




# United States Department of the Interior

FISH AND WILDLIFE SERVICE

WASHINGTON, D.C. 20240



ADDRESS ONLY THE DIRECTOR,  
FISH AND WILDLIFE SERVICE

28 Mar 1991

Jack Barry  
USDA Forest Service - WO  
Forest Pest Management  
2121 C Second Street  
Davis, CA 95616

Dear Jack:

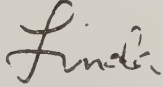
I have at last unpacked all of my materials from NARTC, and it is time to extend some hearty thank yous. I am most appreciative to you, John Taylor, and other members of the planning committee for allowing me the opportunity to participate. I enjoyed the opportunity to share my thoughts on pesticide regulation with the class, and learned much through interacting with both the faculty and students.

I found the 1989 course to be excellent, and the 1991 version exceeded 1989 standards. The expanded monitoring section and increased "hands-on" with equipment were especially practical. I have already used information and skills gained in a training session given to Fish and Wildlife Service's Region 3 contaminants biologists. In addition, I often refer to the course materials and contacts made at Marana to assist others with questions and concerns about pesticides.

In a related matter, next month I will be leading a session on pesticides at in-service training for all USFWS contaminants biologists. Among other materials, the reference "Pesticide Safety: Guidelines for Personnel Protection" (FPM 83-1) would be an excellent publication to provide the biologists. Would you kindly advise me on how USFWS might procure about 125 copies? Although still tentative, I may also be involved with in-service training for USFWS Law Enforcement personnel. If that comes to pass, I would be interested in procuring about another 200 copies. Please let me know if this is feasible.

I very much enjoyed my stay at Marana. The course was terrific, and efforts of you and the NARTC staff enabled it to run smoothly. Please let me know if I can be of assistance to your efforts in any way.

Sincerely,

A handwritten signature in cursive script, appearing to read "Linda".

Linda A. Lyon  
Fish & Wildlife Biologist

Environmental Contaminants Division  
U. S. Fish and Wildlife Service  
4401 N. Fairfax Dr.  
Arlington, DC 22203

Phone: 703-358-2148; FTS-921-2148

cc: John Taylor



MEMO TO: JOHN TAYLOR

FROM: PARSHALL BUSH

CONCERNING: ADVANCED PESTICIDE TRAINING COURSE, MARANA, AZ 2/18/91

DATE: FEB. 28, 1991

IDEAS FOR NEXT TIME:

THE MONITORING SECTION SHOULD BE INTRODUCED WITH A BACKGROUND SECTION ON PESTICIDE FATE:

- A. FACTORS THAT EFFECT PESTICIDE APPLICATION  
VOLATILIZATION, DRIFT, T<sub>1/2</sub> ETC
- B. HYDROLOGY  
GENERAL DISCUSSION OF FLOW PATHS AND HOW THEY ARE MEASURED
- C. SOILS  
GENERAL DISCUSSION OF SOIL TYPES AND HOW THE EFFECT PESTICIDE FATE, MOVEMENT AND PERSISTENCE
- D. DEFINITION OF TERMS ( BASE FLOW, RUNOFF, KD, KOC ETC)

THIS SECTION WOULD THEN BE FOLLOWED BY REVIEW OF HERBICIDE AND INSECTICIDE FATE LITERATURE. OTHER SECTIONS WERE OK IN ORDER.

COMPUTER MODELING SECTION SHOULD INCLUDE SOME SITE SPECIFIC EXAMPLES.

INDUSTRIAL HYGIENIST SHOULD TELL HOW TO MONITOR WORKER EXPOSURE AND GO THROUGH AN EXAMPLE.

MONITORING LECTURE SHOULD INCLUDE AN EXAMPLE OF A MONITORING PLAN (SITE SPECIFIC)

THE AIRCRAFT CALIBRATION AND SWATH ASSESSMENT AT THE AIRSTRIP SHOULD INCLUDE HERBICIDE EQUIPMENT (MICROFOIL BOOM)



## MONITORING PLAN OUTLINE

### I OBJECTIVES

### II SAMPLING SCHEDULE

#### A. SAMPLING SCHEDULE

#### B. SAMPLING LOCATIONS

### III SAMPLE COLLECTION

#### A. PRECAUTIONS

#### B. TYPE OF SAMPLE

##### 1. General considerations:

a. Special requirements for the preparation of sampling equipment and containers to avoid sample contamination.

b. Sample preservation techniques.

c. Reagent quality

d. Sample preservation requirements (grab sample vs. composite)

e. Sample labeling

f. Sample transportation

g. Collection of a representative sample

h. Sample storage and record keeping

i. Sample custody: Chain of Custody

##### 2. WATER (GRAB OR ISCO COMPOSITE)

##### 3. SOIL

##### 4. FOLIAGE/LITTER

##### 5. OTHER

### IV QUALITY CONTROL PROGRAM

#### A. Field sampling preparation:

1. Presampling preparation of sampling plans, sampling equipment and containers,
2. on-site collection of site-specific and quality Control Samples
  - a. Field blanks
  - b. Split samples between laboratories
  - c. Field spikes and blanks ( Samples should be fortified at or near a decision point: detection limit, residue tolerance in commodity, action level).
3. post-sampling preparation of laboratory and chain- of custody forms.

## V FORMS

### A. FIELD NOTEBOOK

Bound field notebooks with numbered pages should be used during field activities to record the samples collected, sample times, locations, description of samples and any other pertinent information or unusual circumstances encountered during sampling or field activities. Entries should be signed and dated by the person making them.

### B. CHAIN OF CUSTODY

### C. DOCUMENTATION



MESSAGE DISPLAY

Barry, Jack:SCS06

From: DANIEL B TWARDUS:S24LO8A  
Postmark: Mar 29,91 9:08 AM Delivered: Mar 29,91 6:07 AM  
Subject: Reply to: Unit Leader and Steering Committee Report

---

Reply text:

From: DANIEL B TWARDUS:S24LO8A  
Date: Mar 29,91 9:08 AM  
I don't have a lot to say; but, in general I would like to see the course oriented more towards FPM and state entomologists not technicians, foresters, etc. I just think we need to re-think who we are providing training for and why. I would like to see a course like this specifically directed at entomologists in FPM and the states. Not technicians and the rest of the forestry world. Secondly, I would suggest a modular design similiar to fire. But the topics I think were fine.

Preceding message:

From: Barry, Jack:SCS06  
Date: Mar 26,91 9:32 AM  
Soon I will put together a report of our national training course we recently completed at Marana. We will use the report at our course critique meeting. To make the report meaningful and complete I need your input as a unit leader and/or steering committee member. I would appreciate a one or two page summary of what you thought of your unit and what you thought of the course as a whole. If you add to this your recommendations for a future course I will have a complete package. I would appreciate your comments by April 11.  
Thanks. Jack

-----X-----



MESSAGE DISPLAY

To Barry, Jack:SCS06

From: JOHN W. TAYLOR:R08A

Postmark: Mar 26,91 2:56 PM

Delivered: Mar 26,91 11:58 AM

Subject: Reply to: Unit Leader and Steering Committee Report

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Reply text:

From: JOHN W. TAYLOR:R08A

Date: Mar 26,91 2:56 PM

THOUGHT THE COURSE AS A WHOLE HAD IMPROVED SIGNIFICANTLY, BOTH IN THE CHOICE OF SUBJECT MATTER AND THE QUALITY OF INSTRUCTION. SPEAKERS WERE GENERALLY WELL PREPARED, KNOWLEDGEABLE, AND PRESENTED THEIR INFORMATION IN AN INTERESTING MANNER. I DO FEEL THAT THE SECTION ON MONITORING SUFFERED FROM A LACK OF TIME. WE HAD TO RUSH THE STUDENTS THROUGH THE STATIONS, AND DIDN'T HAVE TIME TO THOROUGHLY ANSWER SOME OF THEIR QUESTIONS. I THINK THAT AT LEAST ANOTHER 4 HOURS SHOULD BE ADDED TO ANY FUTURE SESSIONS ON MONITORING IF THE PRESENT FORMAT AND CONTENT IS RETAINED.

Preceding message:

From: Barry, Jack:SCS06

Date: Mar 26,91 9:32 AM

Soon I will put together a report of our national training course we recently completed at Marana. We will use the report at our course critique meeting. To make the report meaningful and complete I need your input as a unit leader and/or steering committee member. I would appreciate a one or two page summary of what you thought of your unit and what you thought of the course as a whole. If you add to this your recommendations for a future course I will have a complete package. I would appreciate your comments by April 11.  
Thanks. Jack

-----X-----





APPENDIX E

ROSTERS - STEERING COMMITTEE,  
FACULTY, & STUDENT



# Steering Committee, Faculty, and Student by Organization

## Steering Committee Members

11 (Total)

WO/FPM	2
WO/F&AM	1
Region/FPM	4
NA/FPM	2
NFS	1
FS Research	1

## Faculty Members

51 (Total)

WO/FPM	4
Region/FPM	6
NA/FPM	7
NFS	3
FS Research	4
Other Federal	5
State	3
University	9
Foreign Government	1
Industry	9

## Students\*

66 (Total)

Region/FPM	15
NA/FPM	8
NFS	19
Research	3
Other Federal	8
State	7
University	1
Foreign Government	4
Industry	1

\* Some students severed as faculty and the tally is double counted.





STEERING COMMITTEE MEMBERS FOR NATIONAL ADVANCED  
PESTICIDE MANAGEMENT TRAINING

JACK BARRY  
WO, Forest Pest Management  
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WO Forest Pest Management  
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Pacific Southwest Forest  
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Northwest Area State & Private Forestry  
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COMM: 304-291-4133  
DG: :S24L08A

JULIE WEATHERBY  
R-4 State & Private Forestry  
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DG: :R04F02A

LARRY YARGER  
NA-S&PF, Forest Pest Management  
Room 500  
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Milwaukee, WI 53203

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DG: :R09A

NATIONAL ADVANCED PESTICIDE MANAGEMENT TRAINING  
FEBRUARY 18 - MARCH 1, 1991  
MARANA, ARIZONA

FACULTY ROSTER

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DR. KEN BENTSON  
Life Sciences Department  
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Las Vegas, NM 87701

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NATIONAL ADVANCED PESTICIDE MANAGEMENT TRAINING  
FEBRUARY 18 - MARCH 1, 1991  
MARANA, ARIZONA

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# SUMMARY OF LAST DAY GROUP EXERCISE PESTICIDE COURSE CRITIQUE

Marana, AZ

Prepared by: Mike Landram

Mendocino National Forest

3/1/91

Note: Each student was assigned to one of 10 student work groups. Mike Landram chaired a group with the following assignment. You are responsible for developing a national advanced pesticide training program for use by the Forest Service. What topics should be covered (be specific)? How much time should be devoted to each topic? Who should attend your proposed training?

## 1) Who should attend this course?

Recommendation: Drop the current course - "that attendees will be able to provide Region and area pesticide-use training". Because FS has few employees who's responsibility it is to conduct such training.

Focus on training people who's job requires a broad practical understanding of pesticide applications.

## 2) Current class consisted of:

1/3 People that are only interested in herbicides  
1/3 People " " " " " insecticides  
1/3 People " " " " " both or others.

### Recommendations:

Run concurrent sessions.

Have Instructor give lecture twice, first time to herbicide users (herbicide examples), second time to insecticide users (insecticide examples).

## 3) Topics to add to the course.

### Recommendations:

Large project planning, staffing, and operations.  
Efficacy of pesticides.



APPENDIX F

PLANNING 1991 COURSE





I am proposing to call a meeting of the new pesticide management training steering committee for May 16-17, 1989 at Albuquerque. The purpose of the meeting will be to review summary of faculty and student critiques, and to design the new course. I also would like to profile the new unit leaders and instructors. In some cases we may be able to name certain individuals, but for the most part the mobility of FS personnel negates faculty assignments at this early date. There were many excellent suggestions on how we might build a truly advanced pesticide management course and identify a target audience (students) to support pesticide use by the FS, its cooperators and other federal agencies. Some of the ideas are masterful and exciting. While the iron is hot we need to move. Meanwhile I will meet with Julie Weatherby to summarize the critiques in Salt Lake City on April 18, 1989.

Considerations for the Steering Committee are as follows:

Proposed Committee

Larry Gross

WO (If Larry wants to continue on the Committee I suggest he work closely with RES, FL, TM, and RGE to get WO input for the Committee)

Jed Dewey

R-1 (Jed may not want to continue)

Larry Yarger

NA

Julie Weatherby

R-4

Jesus Cota

R-3

John Ghent

R-8

Dan Twardus

NA (Dan to canvass State Cooperators and provide their input)

District Silviculturist

R-5 (Need to stay tuned-in to district folks)

Forest Range Con.

R-2, R-3, or R-4

Pesticide Coordinator

R-6 (To be selected)

Research

FIDR or TMR (One who knows national needs)

NARTC

Roger Corner

NARTC course leader

Ad Hoc Members - Advisory

Forestry Educator

(Logan Norris)

BLM

(Diane White)

Selection criteria for the Committee are: Commitment, work, interest, vision, an awareness of FS pesticide management needs, and qualified to be a unit leader. Roger Corner mentioned that all other NARTC Steering Committees are smaller than the FPM Steering Committee; and I have an intuitive feeling that this committee would be too large. Also let's give some thought to the unnamed people. Roger Corner is arranging for a motel and facilities in Albuquerque.

After you review this please give me a call - thanks -- Jack.





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June 12, 1989

REPLY TO: 2150

SUBJECT: Trip Report - Pesticide Training Steering Committee

TO: Max Ollieu

The National Advanced Pesticide Management Training Steering Committee met at Albuquerque, NM, 16-17 May 1989 (Ref. 1).

References-

1. NARTC Steering Committee Packet Brochure, for May 16-17, 1989 meeting.
2. Draft - Steering Committee notes dated, 6/2/89, DG message from Roger Corner.

Purpose of Meeting-

1. Review student, faculty, and NARTC critique and comments on approaches to enhance the next course.
2. Review, revise, develop, and schedule appropriate course topics for a national level session.
3. Review, revise, and develop course and unit objectives.
4. Identify unit leaders and potential instructors for next course.
5. Establish course and critical dates.

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Discussion-

1. Review student, faculty, and NARTC critique and comments on approaches to enhance the next course.

a. Students comments.- In general, the students viewed the course very favorably, and felt that the course supported the course objective. They were concerned; however, that the course did not rate its advanced billing. Most felt that the course would be more appropriately described as basic and/or general. The students were more interested in specific applied information as opposed to general theoretical information.

Some students indicated that too much emphasis was placed on large aerial application projects. Many in the audience were more interested in small (<1000 ac) ground applications.

The class suggested several topics that need to be included or expanded e.g. specific and practical methods to monitor environmental effects on non-target organisms and potential human health risks. In addition they would like to see this topic expanded to include not only methods of monitoring but interpretation of results. It was suggested that a 1/2 - 1 day toxicology session might help prepare field personnel to make better decisions and to respond to public concerns in a more informed manner.

The class was interested in a more intensive exposure to application equipment particularly dealing with various advantages and disadvantages, and capabilities and limitations of spraying systems. Many expressed an interest in learning more about the structure, function, and potential problems associated with specific equipment, and for more hands-on practice at calibrating various systems.

A common suggestion was to expand the session dealing with selection of appropriate pesticides to consider specific pesticide products including information on their efficacy against target organisms, appropriate application methods and environmental effects.

Several suggestions were made to improve the course structure. Because of the diversity and the size of the audience, the participants felt that it would be beneficial to divide the group into smaller interest groups and to hold concurrent sessions e.g. herbicides and insecticides.

The students expressed an interest in more, small group activities such as workshops, problem solving sessions, hands-on field exercises, etc. thus providing more opportunity for interaction.

Student critiques on items pertaining to the quality of the instruction were very positive. Most felt that the instructors used their class time well, that they attempted to demonstrate how lessons relate to practical situations, and that they were knowledgeable and enthusiastic about their subjects. Several students, however, felt the presentations were often rushed and instructors tried to cover too much material in too little time. Because of time constraints, question and answer sessions were often cut short.

b. Faculty Comments.- Quality of instruction was high reflecting a vast improvement over the 1986 session. Some instructors had too heavy a schedule. Field exercises did not meet expectations and it was suggested that the complex logistics require someone stationed in R-3 Marana to coordinate with the Region, NARTC, industry, and contractors. Last minute faculty changes by supporting Regions, occasional lack of communications between unit leaders and faculty, and some lack of faculty commitment caused problems for the course administrators. Faculty and faculty supervisor commitment will be essential to conducting quality courses in the future.

Echoing the students, the faculty also gave high marks to the panel discussions, evening sessions, quality instruction, and the student scenarios.

c. NARTC Comments.- NARTC through Roger Corner commented on the importance of faculty attending the faculty critiques (some faculty members repeatedly failed to attend); of NARTC doing all the visuals; and of need for faculty to remain at Marana throughout the course. A few of the faculty remained at Marana throughout the course. On the matter of concurrent sessions NARTC stated that they are capable of supporting the concurrent session approach.

2

2. Review, revise, develop, and schedule appropriate course topics for a national level session. After lengthy discussions centered around geographical and disciplinary issues, the steering committee decided that a national level pesticide course was needed to meet current and future needs of the Forest Service.

a. Dates of Next Course. - February 19, 1991 - March 1, 1991. Roger Corner (NARTC) is developing the critical dates based upon the projected course dates.

b. Instructional Units and Unit Leaders.

1. Environmental Monitoring - J.W. Taylor
2. Spray Behavior and Physics - L. Yarger
3. New Equipment and Calibration - J. Cota
4. Characterization - D. Twardus
5. Pesticide Adjuvants - P. Shea
6. Evening Sessions - (To be named)
7. Course Evaluation - J. Weatherby

Candidate instructors were identified and unit leaders will choose from the list prospective instructors and alternates (see Ref. 2).

3. Title, and Course and Unit Objectives.

a. Course Title. - National Advanced Pesticide Management Training.

b. Course Objective. - To provide a forum for pesticide technology transfer. Upon successful completion of the course the attendees will be able to provide Region and Area training, and to conduct quality pesticide projects using state-of-the-art technology.

c. Unit Objectives. - These are to be developed by unit leaders and presented at next meeting of steering committee.

4. Next Steering Committee Meeting, Salt Lake City, 6-7 September 1989.



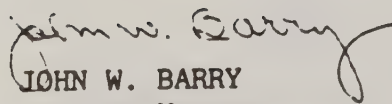
### Discussion Summary-

Although the discussions herein focused more on what went wrong than what went right, the course was highly successful as judged by the students. This was the second national pesticide course and it is still in a developmental stage to identify field needs. National events are in transition thus making it difficult to "crystal-ball" 2 to 3 years in advance to decide what will be needed. Pesticide use, being a complex economic, biological, social, and political issue, is viewed differently by different disciplines and geographic areas. It is a challenge to project ahead and design a course that satisfies the needs of our national multifaceted work force. The steering committee meets this challenge and is developing a course to meet the Forest Service's national pesticide training needs of the 1990's.

### Conclusion-

The Albuquerque meeting of the steering committee reviewed the 1988 course and laid the foundation for the national pesticide course to be conducted at Marana, AZ in 1991. The committee pursued an exhaustive evaluation of the 1988 course and need for a future course. Once the members were able to broaden their disciplinary and geographic perspectives, and project future national pesticide use needs of the Forest Service, agreement was reached to proceed with a course to meet projected field needs.

Thanks to Roger Corner, NARTC, for assistance in organizing this meeting.

  
JOHN W. BARRY  
Program Manager

cc: Dennis Hamel (WO/FPM)





United States  
Department of  
agriculture

Forest  
Service

2121 C Second St.  
Davis, CA 95616  
(916)758-4600

REPLY TO: 2150 *Marana III*

April 27, 1989

SUBJECT: Background information for Albuquerque  
meeting

TO: Steering Committee - National Advanced Pesticide  
Management Training (1991)

In preparation for our steering committee meeting in Albuquerque, NM, 16-17  
May 1989, you might want to review the enclosed:

1. Student evaluations of the 1989 course.
2. Summary of the course evaluations.
3. Proposal for the 1991 Marana course.
4. Questions fielded during classroom review of field exercises -  
3/1/89.

A special thanks to Julie Weatherby for summarizing the student evaluations  
and developing a proposal for the 1991 Marana course.

  
JOHN W. BARRY  
Chair, Steering Committee

Encls.



Caring for the Land and Serving People

FS-6200-28b(4 88)



NATIONAL ADVANCED PESTICIDE MANAGEMENT TRAINING  
FEBRUARY 21 - MARCH 3, 1989  
MARANA, AZ

SUMMARY OF THE STUDENT COURSE EVALUATIONS

In general, the students viewed the course very favorably. They felt that the course supported the course objective. They were concerned; however, that the course did not rate it's "ADVANCED" billing. Most felt that the course would be more appropriately described as basic and/or general. During discussions it was discovered that the students were more interested in specific applied information as opposed to general theoretical information.

In order to adequately address advanced topics, it was suggested that the scope of the course should be better delimited. The present broad course outline may inhibit development of advanced topics. Some students felt that if the scope of the course were changed a 1 week course would provide adequate time to cover technical applied information. Many felt that the cursory treatment of NEPA was not beneficial. A few suggested that we drop this from the course and only mention that students who need more familiarity with the NEPA process should take advantage of existing NEPA training. Others felt that if NEPA were to be included it must be expanded.

The course title indicated that aspects of pesticide management would be covered. A few participants felt that the emphasis was really placed on insecticides and herbicides used in forest stand management. Other pesticides (i.e. rodenticides, etc.) and other ecological communities (i.e. range, etc.) were not addressed.

Some students indicated that too much emphasis was being place on presenting information which was specific to large aerial application projects. Many in the audience were more interested in small (<1000 ac) low impact ground applications and they felt that this aspect was often neglected.

The class suggested several topics which need to be included or expanded. They were interested in specific and practical methods to monitor environmental effects particularly in reference to non-target organisms and potential human health risks. In addition they would like to see this topic expanded to include not only methods of monitoring but interpretation of results. It was suggested that a 1/2 - 1 day toxicology session might help prepare employees to make better decisions and to respond to public concerns in a more informed manner.

The class was interested in a more intensive exposure to application equipment particularly dealing with various advantages and disadvantages of spraying systems, and appropriate and commonly used atomizers. Many expressed an interest in learning more about the structure, function, and potential problems associated with specific equipment. Many emphasized the need for more hands-on practice at calibrating various systems.

A common suggestions was to expand the session dealing with selection of appropriate pesticides to consider specific pesticide products including



information on their efficacy against target organisms, appropriate application methods and environmental effects.

Additional topics suggested for inclusion or development during the course were:

- 1) mixing, storage, transportation and disposal of pesticides
- 2) micro-site weather effects and spray behavior
- 3) safety
- 4) specific in-depth case studies
- 5) ordering project supplies
- 6) project demobilization
- 7) noxious weed management
- 8) range and wildlife treatments

Three activities received numerous accolades. The panel discussion held during the first day of class was a big success. A suggestion was made to include a wildlife biologist on the panel. The optional evening program was well received. The student group scenarios that concluded the course were also well received. Comments concerning these activities were all very positive.

Several suggestions were made to improve the course structure. Because of the diversity and the size of the audience, the participants felt that it would be beneficial to divide the group into smaller interest groups and to hold concurrent sessions. Several logical interest groups could be formed. These included people interested in insecticide applications, herbicide applications, aerial applications, ground applications, regional applications, etc. Most students suggested dividing the class into insecticide and herbicide interest groups.

In addition the students expressed an interest in more, small group activities such as workshops, problem solving sessions, hands-on field exercises, etc. They felt that these types of activities would break up the monotony created by the continuous lecture format and give more opportunity for interaction.

Almost universally, the participants recognized the value of hands-on field exercises. However, the class also emphasized that the field exercises as conducted during this course did not effectively use class time. A common suggestion was that field exercises should not exceed 1/2 day of continuous time. Many short sessions scattered throughout the course were proposed rather than 1 or 2 long sessions. Many students indicated that they would have enjoyed a small group problem solving format where they could design application specifications and configure spray equipment to accomplish the objectives of assigned scenarios. They emphasized the need and desire to be actively involved with hands-on tasks. Several students addressed the need to return to the classroom after field exercises for a question and answer session and to summarize the field exercises. Many students commented that the classroom discussion which did follow the final morning of field exercises on



3/1/89 was very valuable. It was repeatedly suggested that the field exercises should be expanded to cover more than just aerial application.

The student critiques on items pertaining to the quality of the instruction were very positive. Most felt that the instructors used their class time well, that they attempted to demonstrate how lessons relate to practical situations and that they were knowledgeable and enthusiastic about their subjects. It was suggested that more emphasis should be placed on practice before live audiences. Several students felt the presentations were often rushed because the instructors tried to cover too much material in too little time. Because of time constraints, question and answer sessions were often cut short.

In general, the students appreciated the services and facilities provided by NARTC. Several participants commented favorably on the notebooks. They felt that the course notebook would serve as a good reference for future training sessions and projects. They emphasized that they would like to have more complete outlines and in many cases copies of the viewgraphs. Students appreciated the facilities particularly the audio-visual equipments. A few students commented that the course orientation packets should include information on the cost of rooms, meals, etc. In addition, participants should be polled concerning smoking habitats prior to arriving at Marana in order to prevent problems between roommates. The students appreciated the effort made by Roger Corner to provide a means of obtaining rental cars for weekend traveling. Most found the stay at Marana to be enjoyable and a good location for the training.

## SUMMARIZATION OF STUDENT RESPONSES FROM COURSE EVALUATION FORMS

The course objective, as listed in the course brochure, is "to train a cadre of personnel who can provide region and area training and assistance in designing and implementing quality pesticide projects using state of the art technology."

- |  |         |                    |           |
|--|---------|--------------------|-----------|
| 1) Did the content of this course support this course objective? | No<br>7 | Most of time<br>24 | Yes<br>18 |
|--|---------|--------------------|-----------|

Comments: Much of the course content was viewed as being too basic and general. A more in depth treatment of certain topics was suggested in order to make the course a truly "advanced course."

Many participants felt the course helped to prepare people to participate in large pesticide projects but they did not necessarily feel qualified to serve as a trainer.

- |  |         |            |            |           |
|--|---------|------------|------------|-----------|
| 2) Did instructors demonstrate how lessons relate to practical situations? | No<br>1 | Some<br>19 | Most<br>12 | All<br>13 |
|--|---------|------------|------------|-----------|

Comments: Some of the material was specific to FS policy only and not useful to participants from other agencies.

Aerial demonstration and calibration exercises were very practical.

Insufficient time for practical situations.

Question and answer sessions helped to surface practical situations. Students generally encouraged the use of question and answer sessions.

It might have been more effective and practical to give small groups a real life problem and let them apply the information contained within the sessions to solve specific problems.

Suggestion was made to use more specific case studies.

- |   |         |                |               |
|---|---------|----------------|---------------|
| 3) Did instructors use class time well? | No<br>2 | Sometimes<br>8 | Usually<br>37 |
|---|---------|----------------|---------------|

Comments: Time spent on flight-line was poorly used.

Reevaluate class schedule because some instructors needed more time.

Practice presentations before a live audience before presenting to the class. Instructors would profit from training in instructional techniques.

In general, instructors tried to cover too much in too little time.

Some overlap in subject matter during various sessions.

Concurrent sessions would have better utilized time, created smaller groups and enhanced more interaction between students and instructors.

4) Was adequate time allotted for questions and answers, discussions and group interactions?	No 5	Sometimes 10	Usually 31
--	---------	-----------------	---------------

Comments: Evening sessions proved valuable to handle the overflow of questions.

Question and answer sessions were usually cut short.

Instructors may want to have some planted questions to stimulate some discussion. Allow folks in session to turn in written questions at any time and post the responses.

Liked question and answer session after field exercises on 3/1 at 11:00 AM.

The excellent panel held during the first day did not get enough time to interact with the class.

5) What topics do you believe should have been given more time/less time?

- More Time:
- a) Practical exercises
  - b) More hands on problem solving
  - c) Types of pesticides and their efficacy on certain targets and their environmental effects
  - d) Environmental monitoring methods and interpretation of results
  - e) Discussion covering ordering project supplies
  - f) NEPA and how to effectively deal with the public and special interest groups.
  - g) Classroom discussion of nozzles, types, uses, adjustments.
  - h) Add wildlife biologist on coordination and monitoring aspects.
  - i) Spend time in classroom with sample spray cards. Discuss VMD's for herbicide and insecticide applications.
  - j) More problem solving on calibration, etc.
  - k) Ground herbicide applications
  - l) More ICS introduction
  - m) More on swath kit
  - n) 1/2 - 1 day session on Toxicology (Ed Calabrese, U of Mass.)



- o) Safety
- p) Storage, transportation and disposal
- q) Collection, stabilization, processing and analysis of batch pesticide mixes.
- r) More classroom time on calibration and characterization.
- s) More classroom time on micro-site weather effects and spray behavior.

- Less Time:
- a) Aerial application, particularly the expensive field exercises.
  - b) Other national level training covers the NEPA process.
  - c) Condense the introductory unit.
  - d) Too much emphasis on aerial application.
  - e) Contracts
  - f) Reduce general information in order to reduce course duration to 1 week.
  - g) Sessions on prescriptions
  - h) Field characterization

- 6) What course material do you believe should be available for reading prior to attending the course?

- Comments:
- a) Schedule of topics by date, time and speakers
  - b) Background information on current status of vegetation management EIS's
  - c) Current events information
  - d) Comprehensive index of current reference materials
  - e) Variety of project plans
  - f) Probably none because no one has time to read them.
  - g) Entire binder
  - h) Precourse problems and answers
  - i) Orientation packets should contain information on cost of rooms, meals, etc.
  - j) FSM, Air Op. manual

- 7) What other recommendations would you make regarding course content to enable us to better serve the needs of Agency Administrators? Are there other topics or units which you would like to see included in the course?

- Comments:
- a) More time spent in actual project case studies and evaluation of project results with feedback to improve on performance.
  - b) More time on low impact applications of herbicides.
  - c) Break class into small work groups at very beginning and then let them work out solutions to problems for each course area.
  - d) Have a source or provide a library of training materials that could be used to order materials or to borrow training materials when we put on training sessions.
  - e) Have more mechanical ground equipment available for exercises.



- f) Include lesson plans for Unit 1.
- g) More student presentations.
- h) Hold course somewhere else to avoid \$50,000 charge.
- i) Routine herbicide applications of <1000 ac.
- j) Regional training sessions would be more beneficial with more emphasis given to regional needs.
- k) Noxious weed management
- l) Range and wildlife treatments
- m) Fluid mechanics and spray behavior
- n) Replace numbered dividers in notebook with subject dividers.
- o) All pesticides not just herbicides and insecticides.
- p) Consider video-taping some presentations for later use.



Date: 4/24/89

Subject: Revisions - National Advanced Pesticide Training Session III

1/3

From: Julie Weatherby

=====

### Suggested Joint Sessions

1. Keynote address - Chief
2. Current issues - WO, FPM
3. Forest Supervisor's perspective on the use of pesticides for multiple resource management - Panel consisting of Supervisors from Forests where the program emphasizes range, timber, recreation, etc.
4. Public issues panel - Managing controversy through public involvement (Environmentalism, Wildlife biologist, Industry representative, etc.)
5. Basic toxicology
6. Environmental monitoring - Field and lab procedures, relate quantitative results to human risk and environmental threat.
7. Safety, contingency planning, and spill planning
8. Pesticide storage, transportation, and disposal
9. Contracting panel - Panel consisting of contracting officer, project officer, and contractor.
10. Spray behavior and meteorology
11. Group presentations of student scenarios
12. Presentation of the Tuscon Chamber of Commerce
13. Project Administration - Green card system, communications, fiscal, personnel, cooperators.
14. Pesticide use databases

-----

### Concurrent Sessions

Divide into 3 resource management groups. Assign unit leader and assistant.

Timber	Range	Insecticide
-----	-----	-----
Site prep	Noxious weeds	Defoliators
Release	Rodents	Bark beetles
Rodents	Predators	Seed & cone
	Range improvement	Range insects

1. Process for analyzing treatment needs
  2. Registered and recommended pesticides (discuss by chemical)
    - a. results of field projects - regional, national, & canadian results
    - b. target pests
    - c. MSDS, labels
    - d. modes of actions
    - e. timing
    - f. environmental considerations
    - g. methods of application
    - h. adjuvants
  3. Selection of appropriate equipment
    - a. atomizers - types, selection, uses, limitations, capabilities
    - b. spraying systems
    - c. spraying aircrafts
    - d. aerial equipment
    - e. mechanical ground equipment
    - f. hand-held equipment
    - g. mixing/loading
    - h. sources for equipment
  4. Calibration workshops
    - a. hand-held equipment
    - b. mechanical ground equipment - HV hydraulic, boom sprayer with flat fan, hollow cone
    - c. aerial equipment
    - d. special booms - mock setup to calibrate aerial atomizer (rotary atomizers, etc.)
  5. Aerial spray model workshops
    - a. AGDISP
    - b. FSCBG
    - c. CASRP
    - e. EMCOT
  6. Characterization of spray systems
    - a. classroom
    - b. field
  7. Spray assessment workshop
    - a. swath kit
  8. Aircraft guidance system workshop
- 

#### Evening Sessions

1. Instructor training
2. Computer models
3. Weather, climate and forecasting



4. Contracting workshop
5. Biodiversity and pesticide use
6. Expert witness.



NATIONAL ADVANCED PESTICIDE MANAGEMENT COURSE  
FEBRUARY 21 - MARCH 3, 1989  
MARANA, AZ

QUESTIONS FIELDLED DURING CLASSROOM REVIEW OF FIELD EXERCISES - 3/1/89

QUESTION #1 -- How do you determine which type of nozzle to use for specific purposes?

ANSWER -- Rotary atomizers (Micronairs, Beecomists, etc.)  
Types of application - LV (1-2 gal/ac) and ULV (<1 gal/ac)  
undiluted (neat) or diluted.  
Strengths - more uniform range of droplet sizes as compared  
to other traditionally used nozzles, particularly  
when target VMD is small.  
Weaknesses - expensive, contractors are less likely to have  
rotary atomizers.  
Comments - Rotary atomizers may be illegal for herbicide  
applications in some states - Check with the  
agricultural commissioner.  
Hydraulic nozzles  
Types of applications - LV applications (1-2 gal/ac) with  
VMD's 250-350 microns and HV  
applications (5-10 gal/ac)  
with VMD's > 350.  
Comments - APHIS established that flat fan nozzles were the  
best nozzles for aerial applications but in  
reality they are not much different than hollow  
cone nozzles.  
Quality control  
Buy nozzles you want operator to use including nozzle bodies,  
orifices, etc. This way you will be sure to have the correct  
set-up.

QUESTION #2 - What pressures are best for herbicide and insecticide applications?

ANSWER - Herbicide applications 20-30 PSI; insecticide applications 40  
PSI. Crop Hawk or other comparable systems records pressure.  
Also if you want to check pressure buy a pressure gauge and  
install it on the boom. Do not count on the guage provided by  
the applicator. Accurate pressure guages are necessary  
for calibration and for maintaining proper application rates.

QUESTION #3 - How much variation in air speed is acceptable?

ANSWER - Aircraft speed may vary 10 to 30% when spraying in mountainous  
terrain. Crop Hawk or radar gun can be used to check air  
speed. Aerial observers also can time spray on and off for a  
flight line of known distance within a spray block.

QUESTION #4 - After initial calibration and characterization runs how do you check the output without asking contractor to take time to do additional runs?

ANSWER - It is a good idea to check calibration periodically during treatment. This check can be done in various ways e.g. check Crop Hawk recorder or compare to known acres treated to volume required to refill hopper.

QUESTION #5 - Isn't it standard practice to keep radio contact with pilot?

ANSWER - It is almost a necessity for safety and operational control. Your contract should specify radio requirements. Forest or Region policy probably spells this out, if uncertain check with dispatcher or fire-aviation staff.

QUESTION #6 - How do you insure a quality job?

ANSWER - For biologicals save some tank mix for analyses of potency, and to check on potential contamination. Everytime you batch, keep a sample for environmental monitoring records.

When you collect samples, storage may be critical. Some must be frozen or kept on ice during transit.

People involved in environmental monitoring should be totally free of contamination. Don't use people who have been in spray blocks, or near aircraft or loading areas.

QUESTION #7 - If you are spraying near a sensitive area and you've found 2 drops on a spray card next to a stream, what do you do?

ANSWER - I assume the spray job is over and your concern is to prevent a repeat of the environmental trespass and to correct procedures that lead to the trespass.

Take water samples for possible analysis.

In the future you might want to use the FSCBG model to plan sampling procedures for environmental monitoring.



MESSAGE DISPLAY

Barry, Jack:SCS06

From: ROGER M. CORNER:W06A

Postmark: Sep 05,90 11:10 AM

Delivered: Sep 05,90 11:03 AM

Status: Previously read

Subject: Reply to: Faculty meeting

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Reply text:

From: ROGER M. CORNER:W06A

Date: Sep 05,90 11:10 AM

Jack, as requested.

Roger

Preceding message:

From: Barry, Jack:SCS06

Date: Sep 04,90 9:44 AM

A reminder that all faculty should be at Marana the week of October 5. Some of you are new to the process thus I am sending the following information. The faculty includes lecturers, speakers and people from industry and universities who will be presenting demonstrations, etc. The purpose of the faculty meeting is to acquaint faculty with the NARTC facilities and procedures. Secondly the meeting provides us an opportunity to coordinate the many details and finalize the schedule. Last and perhaps most important it is a week set aside for you to prepare your lesson plan and to make arrangements with NARTC for training aids. It is essential that all unit leaders be there and that they coordinate the attendance of their instructors. Unit leaders who might excuse an instructor from attendance have the responsibility of providing me a lesson plan for the excused instructor during the week of Oct 15. We will have to reconsider instructors who do not attend the faculty meeting and fail to provide a lesson plan. Again I emphasise that unit leaders have the job of coordinating all needs and information with their faculty. Lastly NARTC is scheduled to mail faculty packages this week to the faculty. Thanks for you cooperation and give me a call if you have any questions or problems. Jack

-----X-----



APPENDIX G

COURSE CALL LETTERS  
& INVITATIONS





United States  
Department of  
Agriculture

Forest  
Service

Washington  
Office

14th & Independence SW  
P.O. Box 96090  
Washington, DC 20090-6090

Reply To: 2150

Date: September 6, 1990

Subject: National Pesticide Management Training

To: Regional Foresters, Station Directors, and Area Director

REPLY DUE NOVEMBER 1

Forest Pest Management announces its third national pesticide training course to be conducted February 18 to March 1, 1991, at the National Advanced Resources Technology Center (NARTC), Marana, Arizona, (see enclosure). You are requested to respond with student nominees by November 1, 1990. We realize that sequestration action could affect the conduct of and attendance at this national course. However, since the course will not be held until mid-February, we wish to maintain our planning schedule.

The purpose of the course is to train a cadre of personnel who can provide Regional and Area training and assistance in designing and implementing quality pesticide projects using state-of-the-art technology.

The course is designed to prepare forest level professional silviculturists, range conservationists, entomologists, pesticide coordinators, and managers whose current or future assignment involves or will involve coordinating and managing pesticide-use training and pesticide-use projects. The scope of the course will not include pesticide use in nurseries and greenhouses.

The course steering committee recommended the following student (Forest Service and State Cooperator) allocations:

<u>Region/Area</u>	<u>Allocation</u>
R-1	5
R-2	4
R-3	3
R-4	4
R-5	6
R-6	9
R-8	10
R-9	2
R-10	2
NA	10
Stations (aggregate)	5

The steering committee further recommended that the following cooperating agencies be extended an invitation to send a student:

National Park Service - 1  
Bureau of Land Management - 1  
Environmental Protection Agency - 2  
Bureau of Indian Affairs - 1  
Animal and Plant Health Inspection Service - 1

Regional Foresters, Station Directors, and Area Director

2

Agricultural Research Service - 1  
United States Air Force - 1  
Armed Forces Pest Board -1  
Extension Service - 1  
Fish and Wildlife Service -1  
U.S. Agency for International Development - 2  
Forest Pest Management Institute (Canada) - 1  
Forest Research Institute (New Zealand) - 1  
Forest Pest Management (Mexico) - 1

Nominations of cooperators should be sent to Max Ollieu who will coordinate cooperator participation.

The parent unit will pay student travel and per diem. WO-FPM will cover the cost of administering the course.

Send nominations to Director, National Advanced Resource Technology Center, Pinal Air Park, Marana, Arizona 85653. Regions and NA will be notified of selections by January 7, 1991.

Questions should be directed to the course chairperson, John W. Barry, 2121C Second Street, Davis, California 95616, or FTS 460-1715 or (916) 758-4600, or via DG: J.Barry:SCS06.

/s/ ALLEN J. SCHACHT for  
ALLAN J. WEST  
Deputy Chief

Enclosure

cc:  
Director, NARTC  
Roger Corner  
Jack Barry  
Julie Weatherby

FPM:M.Ollieu:lt:09/04/90:453-9600



United States  
Department of  
Agriculture

Forest  
Service

Washington  
Office

14th & Independence SW  
P.O. Box 96090  
Washington, DC 20090-6090  
(202) 453-9600

Reply To: 2150-2

Date: OCT 11 1990

man  
See List

The Forest Service announces its third national pesticide training course to be conducted February 18 to March 1, 1991, at the National Advanced Resources Technology Center (NARTC), Marana, Arizona (see enclosure). Approximately 50 Forest Service employees will participate in this training session. In addition, we are extending an invitation to other national and international organizations to send representatives.

The objectives of the course are to train a cadre of personnel to provide Regional and Area training and assistance in designing and implementing quality pesticide projects using state-of-the-art technology. The course will consist of classroom lectures, field exercises, and optional evening sessions covering: pesticides and adjuvants, environmental monitoring, pesticide spray behavior and physics, state-of-the-art equipment and calibration, and aerial spray deposition and swath characteristics.

The course goal is to provide a forum for pesticide technology transfer. It is designed to prepare forest level professional silviculturists, range conservationists, entomologists, pesticide coordinators, and managers whose current or future assignment involves or will involve coordinating and managing pesticide-use training and pesticide-use projects. The scope of the course will not include pesticide use in nurseries and greenhouses.

In addition to the 50 Forest Service participants, we are inviting the following agencies and international units to send participants:

- National Park Service - 1
- Bureau of Land Management - 1
- Environmental Protection Agency - 2
- Bureau of Indian Affairs - 1
- Animal and Plant Health Inspection Service - 1
- Agricultural Research Service - 1
- United States Air Force - 1
- Armed Forces Pest Management Board -1
- Extension Service - 1
- Fish and Wildlife Service -1
- Forest Pest Management Institute (Canada) - 1
- Forest Research Institute (New Zealand) - 1
- Forest Pest Management (Mexico) - 1







mbn

Send responses to Max Ollieu, Assistant Director, Forest Pest Management, USDA Forest Service, P.O. Box 96090, AB-2S, Washington D.C. 20090-6090. Max can be reached by phone via FTS 453-9600 or commercial (202) 453-9600. The Forest Service will cover the cost of administering the course and the participant's organization should cover travel and per diem costs. Please notify us of your selection by December 7.

Questions regarding the makeup of the course should be directed to Jack Barry, Course Chairperson, USDA Forest Service, 2121C, Second Street, Davis, California 95616. Jack can be reached by phone via FTS 460-1715 or commercial (916) 758-4600, or by FAX (916) 758-8181.

Sincerely,

**Allan J. West**

ALLAN J. WEST  
Deputy Chief  
State & Private Forestry

Enclosure

cc:  
Director, NARTC  
Roger Corner  
Jack Barry  
Julie Weatherby







## International

Mr. Ed Kondo  
Director  
Forest Pest Management Institute, Forestry Canada  
P.O. Box 490  
Sault Ste. Marie, Ontario  
Canada P6A 5M7

Ign. Reyes Bonillas,  
Direccion de Sanidad Forestal,  
Guillermo Perex Valenzuela, No. 127,  
Colonia Viveros de Coyoacan,  
C.P. 04100,  
Mexico, D.F.

Director  
Forest Research Institute  
Private Bag 3020  
Rotorua, New Zealand

## Military:

Commander  
907 TAG  
U.S. Air Force  
Rickenbacher NGB, Ohio 43217

Col. Robert W. Clegern  
Executive Director  
Armed Forces Pest Management Board  
Forest Glen Section, WRAMC  
Washington, DC 20307-5001

## U.S. Agencies:

Dr. Jim Miller  
National Program Leader for Wildlife and Fisheries  
USDA, ES  
Room 3871, South Building  
Washington, DC 20250-0900

Mr. Gary Johnston  
Wildlife and Vegetation Division  
USDI, NPS  
P.O. Box 37127  
Washington, DC 20013-7127





Mr. Marshall Cutsforth  
Chief, Division of Forestry  
USDI, BIA  
MIB-Rm 4545  
Washington, DC 20240

Mr. Micheal Warner  
USDA, APHIS  
BBEP-ED  
Room 826, Federal Building  
6505 Belcrest Road  
Hyattsville, MD 20782

Dr. William H. Tallent  
USDA, ARS  
Room 358-A,  
Agriculture Administration Building  
Washington, DC 20090

Mr. Douglas D. Campt  
Director, Office of Pesticide Programs (TS-755C)  
EPA  
401 M Street, SW  
Washington, DC 20460

Director  
U.S. Fish and Wildlife Service  
725 Arlington Square  
1849 C Street, NW  
Washington, DC 20240

Dr. Lewis (Buck) Waters  
USDI, BLM (23C)  
PRE 901  
18th & C Street, NW  
Washington, DC 20240



CHIEF AND STAFF INFORMATIONAL SESSION  
September 20, 1990

**CHIEF'S SCHEDULE.....**The Chief speaks to the National Association of Conservation Districts, Business Advisory Committee, this morning and will travel to Las Vegas this afternoon to speak to the Public Lands Council tomorrow morning.

**VISITORS.....**Mike Matthews, P&CR, introduced Reba Howeya, R-3; Marlene Winchell, Idaho Panhandle NF; and Gene Cyrus, R-6, on detail to P&CR. Overbay introduced Jerry DeGraff, Sierra NF and shared with the Sequoia and Stanislaus NFs. SESCO introduced the PNW Reorganization Process Team: PNW Director Charlie Philpot; John Henly; Dick Woodfin; and Dave Sandberg, here to make a presentation on the overall PNW reorganization.

**GAO AUDIT.....**Hartgraves reported that a GAO audit will conduct an audit on "economic timber sales" looking into the decisionmaking process.

**GRAY WOLVES HEARING.....**Unger reported that the hearing on S.2674, to provide for the reestablishment of the gray wolf in Yellowstone NP and central Idaho wilderness areas went well. The National Park Service and Fish and Wildlife Service handled most of the questions.

**TOTAL QUALITY MANAGEMENT.....**SESCO reported that their TQM session with the Juran Institute was an excellent session. The session was attended by 19 Research staff and some representatives from other Deputy areas. By the end of the session, a draft implementation plan was completed for implementing TQM in Research over the next year.

**FOREIGN TRAVEL.....**SESCO announced that he and Harcharik will travel to Rome this weekend and join Leonard at the Committee on Forestry meeting.

**THE BLACK COLLEGIAN.....**SESCO called attention to the September/October issue of this magazine which contains his article on "Preparing for a Career in Conservation Research." It also has an article "About the Southern Region of the Forest Service."

**INVENTORY OF HUGO DAMAGE.....**Hamilton reported that the SE Station has completed the field work on inventory of Hugo damage to the forests of South Carolina. Preliminary analysis show a 21 percent reduction in softwood inventory and a 6 percent decline for hardwoods. About 60 percent of this timber has been harvested. Regeneration needs are estimated at 2 million acres. A final report is scheduled for December.

**TROPICAL DEFORESTATION.....**Hamilton announced that tonight at 10 p.m., Channel 26 will carry a special on what's going on in tropical deforestation.

**PESTICIDE MANAGEMENT TRAINING.....**Schacht announced a national advanced pesticide management training to be held February 18-March 1, 1991, in Marana. This 70-hour course is designed to prepare forest level professionals to coordinate and manage pesticide training and use activities. Will include classroom instruction and field exercises. The bulk of trainees will be from

the FS but course is open to other Federal agencies, Mexico, Canada, and New Zealand, as an outreach to our cooperators to provide training in the latest pesticide technology.

**MORE HEARINGS.....**Mills reported a hearing next Tuesday or Wednesday on the Illinois Wilderness; Fishlake land exchange; and West Virginia land exchange. Henson will handle. Also, a hearing on October 4 before the Subcommittee on the Civil Service, House Committee on Post Office and Civil Service, on "values in conflict: to cut or conserve as a U.S. forest manager." Testimony should focus on FS historical emphasis on the cutting of timber and recent initiatives toward more comprehensive resource planning, in addition to new perspectives and changes within the FS personnel system. Leonard and Rice will handle.

\*\*\*\*\*





United States  
Department of  
Agriculture

Forest  
Service

Washington  
Office

2121 C Second Street  
Davis, CA 95616

Reply To: 2150

Date: July 20, 1990

Lt. Col. Dennis Crago  
U.S. Air Force  
356 TAS/DO  
Rickenbacker Air National Guard Base  
OH 43217

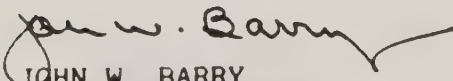
Dear Colonel Crago:

I would like to invite the 356 TAS, Aerial Spray Branch to participate in the third National Advanced Pesticide Management Training Course to be held at Marana, Arizona, February 18, 1990 through March 1, 1991. We have allotted one student space for the 356 TAS.

The USDA Forest Service also requests one USAF C-130E aerial spray aircraft to join us at Marana during the course. The Forest Service has the responsibility to provide technical consulting on forest pest management activities on Department of Defense lands. In the course of this consulting our field entomologists work with the Aerial Spray Branch, thus we feel the participation would be mutually benefiting to both organizations.

I look forward to your reply.

Sincerely,

  
JOHN W. BARRY  
Program Manager

cc: Jesus Cota  
Julie Weatherby  
Noel Schneeberger  
Roger Corner  
Dr. Terry Biery





44/0/4

BR:RO

12 November 1990

Dr Jack Barry  
2121 C Second Street  
Davis  
California  
95616  
USA

*Sent him what  
we have*

Dear Jack

Thank you for your invitation to attend the National Advanced Pesticide Management Training Course next year. Unfortunately I won't be able to make it but there's a possibility that John Ray will be able to attend instead. He'll be in touch as soon as he can confirm that he can go.

I am looking for information on droplet spectra for some FSCBG simulations I need to run. I know that you and Pat have compiled a database on spectra and I wonder if you have unearthed any information on:

- ✓ 1. Foaming nozzles - *don't have anything*
- ✓ 2. Thru-valve boom ) *Sent him Yates + P. cot data*
- ✓ 3. Microfoil boom?

*11/21/90*

If you have any information, perhaps you could pass it on to me?

If we cannot find data on spectra from foaming nozzles (which are very common for aerial applications in New Zealand) we may contract a laboratory with a wind tunnel and a PMS to run some tests for us. Could you suggest any suitable laboratories?

We're enjoying some beautiful spring weather at the moment. This would be a nice time of the year to visit New Zealand!

All the best.

Yours sincerely

*Brian.*

Brian Richardson  
for Director





United States  
Department of  
Agriculture

Forest  
Service

Washington  
Office

14th & Independence SW  
P.O. Box 96090  
Washington, DC 20090-6090  
(202) 453-9600

---

Reply To: 2150

Date: November 29, 1990

Errol Caldwell  
Forest Pest Management Institute  
P.O. Box 490/ C.P. 490  
Sault Ste. Marie, Ontario  
Canada P6A 5M7

Dear Errol:

As we have previously discussed, the Forest Service is conducting the third National Advanced Pesticide Management course in Marana, Arizona on February 28 - March 1, 1991. The 70-hour course includes field activities that provide instruction on the use of the latest pesticide application equipment. We are aware of the work being done in this area by the Forest Pest Management Institute (FPMI) and invite FPMI's participation in the course.

Therefore, the Forest Service is requesting Art Robinson as an instructor/pilot for the course and the use of your Cessna 142 spray aircraft for field activities. If possible, we would like Mr. Robinson and the aircraft available in Marana, Arizona for the duration of the course. The Forest Service can reimburse your agency for the cost of transporting the aircraft to Marana and will cover Mr. Robinson's meals and lodging while at the course. If you agree, please notify us of your approval in writing.

The success of the past two courses has been due to the quality of instruction given by the professional faculty selected for the course. We hope that you will cooperate in this session's success by permitting us to employ Mr. Robinson's expertise. Please contact Jesus A. Cota at (202) 453-9600 if you have any questions concerning this request.

Sincerely,

Jesus A. Cota  
for MAX OLLIEU  
Assistant Director of  
Forest Pest Management

cc:  
Art Robinson, FPMI  
John Barry, FPM Davis, CA  
Jesus A. Cota, WO

FPM:JCota:1mp:11/28/90



APPENDIX H

COURSE  
WELCOMING ADDRESS





## WELCOMING ADDRESS

Remarks by James C. Space, USDA Forest Service, Director Forest Pest Management, Washington, D.C., to Students and Faculty of the National Advanced Pesticide Management Training Course Marana, Arizona, February 18, 1991.

Welcome to the third national pesticide management training course. This course is offered by Forest Pest Management in partnership with the National Advanced Resource Technology Center. The course objective is to prepare an elite cadre of personnel who will train and assist others in designing and conducting quality pesticide projects. The course will emphasize quality in our performance and state-of-the-art technology. As an agency and as individuals we have the responsibility to use state-of-the-art technology and to conduct safe, effective, and cost efficient projects.

Critiques from the previous two courses clearly stated that the field wanted us to periodically provide a course on advanced pesticide technology training. This is the course you asked for. The course focuses on the needs of forest level professional silviculturists, range conservationists, entomologists, pesticide coordinators, and managers who coordinate and manage pesticide use training and pesticide use activities. Considerable resources have gone in to developing this course and I'm sure you will find it to be a productive learning experience.

This course also addresses another important role for Forest Pest Management and our pesticide use, management and coordination program. That role is our commitment to being a productive and effective partner in international forestry. President Bush is encouraging forestry technology and technical assistance to countries that request it. The Forest Service has the lead in implementing this initiative.

Although international forestry assistance is not a new role for the Forest Service or FPM, pesticide use and management training and technology assistance represent new emphasis areas. I am pleased to recognize colleagues from Canada, New Zealand, and Mexico here with us this evening who will be participating in our training session. Information obtained here may support the use of herbicides to restore and maintain native forests, riparian habitats and biodiversity; promote agro-forestry; and protect endangered plants. Formulations of naturally occurring biological control agents might be used to protect high value seed sources; disrupt bark beetles attacks; or to control a defoliator. Future assistance might also include Forest Service sponsorship of an international resident training program in forest protection and forest health management.

I would like to share with you Chief Dale Robertson's position on pesticides and pesticide-use.

1. Pesticides shall be maintained as a control option by the Forest Service and used, when appropriate, along with cultural, physical, and biological methods to manage forest pests and to promote and maintain health of our national forest and range lands.
2. Pesticides shall be used in the safest and most efficient manner possible by people who are well trained and confident in their abilities to use them in a manner consistent with environmental safeguards and resource management objectives.
3. Pesticide use shall follow Federal and State statutes, laws, and regulations, and Forest Service manuals and handbooks.
4. Pesticide use technology shall be developed by the Forest Service and made available to our public and private cooperators.
5. Pesticide use and training shall be shared with our State and private cooperators, other Federal agencies, and our international partners.

Some say that pesticides have no future on Federal lands. This attitude and opinion has been expressed in appeals and litigation directed at our NEPA documents and in comments and decisions made by some Forest Service people. The Chief and I do not support this viewpoint.

We view the use of pesticides as an important tool to the Forest Service in managing the 191 million acres of natural resources that are entrusted to us. We recognize that pesticides are just one of several tools available. Pesticides are generally the last choice in many situations, but it is nevertheless important that we maintain the option and capability to use them. Retaining this option, however, requires that we use pesticides safely and effectively.

The volume of pesticides used by the forestry community is small compared to other domestic and world-wide uses. But pesticides are still essential for managing certain defoliator infestations, most cone and seed insects and nursery pests, and selected bark beetle outbreak situations. In addition, pesticides are important tools in managing unwanted vegetation, noxious weeds, unwanted fish, rodent control, and predatory animals.

NEPA calls for a range of alternatives to be considered when proposing projects. In management of our natural resources, this usually includes a variety of integrated pest management techniques and strategies. We have developed some innovative methods to deal with pests, including unwanted vegetation.



In recent years we have focused a lot of effort on biological insecticide testing and use for defoliators. The bacterial insecticide, Bacillus thuringiensis (B.t.) is now the insecticide of choice for western spruce budworm, Douglas-fir tussock moth and gypsy moth in the West. B.t. and diflubenzuron, an insect growth regulator, are the insecticides of choice for gypsy moth control in the East. The Forest Service is also the registrant of three viral based insecticides for use against the Douglas-fir tussock moth, gypsy moth, and European pine sawfly.

Biological pesticides have not replaced the chemical pesticides in treating unwanted vegetation, but they have been used to control introduced vegetation with some success. We support the USDA Agricultural Research Service in their research efforts to introduce biological control agents for exotic vegetation. Likewise, we support the USDA Animal and Plant Health Service in the distribution of effective biological control agents. The Forest Service assists both the Agricultural Research Service and Animal and Plant Health Inspection Service in biological control agent research and distribution of selected successful agents.

During your careers, many of you will see a new generation of pesticides emerge for use in managing forest and range pests. We expect the current list of registered pesticides for forest and range use to be replaced by compounds, natural or man-made, that are several times safer and more effective than those currently in use. Demands upon our resources, balanced by continued environmental concerns, will force the development of a new generation of biological and semiochemical pesticides. Research is also focused on developing compounds that stimulate natural defense mechanisms in trees and other vegetation. The safe and effective use of these compounds will require new and improved technology in the hands of well-trained technicians and professionals.

Let me give you an illustration. There is a dry herbicide on the market that is registered for application to agricultural crops at nine ounces per acre. Think of the technology and skill required to apply it by aircraft at nine ounces per acre. Contrast this to applying an aqueous herbicide by aircraft at 10 gallons per acre. The responsibility for accomplishing tasks like this will fall to you and the people you train and supervise.

Another important Forest Service contribution to the availability of pesticides as a management tool is our development of human health risk assessments, pesticide background documents, and environmental impact statements (EIS). Forest Pest Management has invested substantial resources in these activities over the past six years. Our work is having a positive effect on public understanding of pesticide characteristics, uses, and effectiveness. These documents also contribute to the successful defense of line officer decisions concerning pesticide use. The courts have ruled in favor of the Forest Service on EIS's involving gypsy moth control nationwide and vegetation management in Region 6. Currently, Regions 1, 2, 3, 4, and 10 along with the Bonneville Power Administration are developing a risk assessment covering use of herbicides in vegetation management. We hope eventually to have a system on the Data General system which will make risk assessment information accessible to all levels within the agency.

You may be interested in the status of the appeals of Regional decisions to use pesticides. We responded to the appeals of the Region 5 vegetation management for reforestation EIS, the Region 6 vegetation management EIS, and the Region 8 Coastal Plain/Piedmont vegetation management EIS and upheld the decisions. The Region 6 nursery EIS was not appealed. Appeal responses are being prepared for Region 8's Appalachian Mountains and Ozark-Quachita Mountains vegetation management EIS's.

In our responses to the vegetation management appeals, we included wording to lift the Chief's March 30, 1984, deferral of herbicide use. The Chief's direction originally included a nation-wide deferral on the aerial application of herbicides over National Forest System lands, restrictions on the ground application of herbicides on National Forest System lands within the Ninth Circuit Court jurisdiction, and a complete ban on the use of herbicides on National Forest System lands in Oregon and Washington. Deferrals have now been lifted by the Chief for noxious weed and poisonous plant control in Region 4, reforestation in Region 5, and all vegetation management in Region 6 and the Coastal Plain/Piedmont area of Region 8. The direction in the Chief's March 30, 1984 letter still holds for Regions that have not completed vegetation management NEPA documents.

We will continue our encouragement and support for those regions that have not completed vegetation management NEPA documentation. This job needs to be completed nationwide and I want to enlist your support to see that the job gets done. We are also beginning the effort to revise and update our national Gypsy Moth EIS. I want to recognize all of you who worked--and are currently working--on NEPA documents--I appreciate your hard work.

In closing, I want to thank the organizers and faculty who are contributing their time and expertise to make this course the success we have come to expect and appreciate. Agencies that have joined forces with Forest Pest Management to offer this training include the Forest Pest Management Institute at Sault St. Marie in Ontario, Canada; the U.S. Air Force; the U.S. Environmental Protection Agency; USDA Animal and Plant Health Inspection Service; USDA Agricultural Research Service; and the States of Arizona, California, Georgia, New Mexico, and Oregon. I also thank you students who, by asking for and attending this course, demonstrate your commitment to the safe and efficient management of pesticides.



APPENDIX I

STUDENT GROUP PROBLEMS



NATIONAL ADVANCED PESTICIDE MANAGEMENT TRAINING  
FEBRUARY 18 - MARCH 1, 1991  
MARANA, ARIZONA

GROUP 1

FACULTY ADVISOR: Harold Flake

SCENARIO -- The draft environmental impact statement for eradication of an isolated gypsy moth infestation in a mountainous area of California was distributed for comment to many organizations concerned with environmental issues. A local chapter of a society for the protection and preservation of native moths and butterflies threatened to appeal any impending decisions which called for the use of insecticides. The society is concerned that isolated populations of several species of butterflies might be exterminated by any applications. The recommended alternative within the DEIS is to utilize aerial applications of Bacillus thuringiensis to eradicate gypsy moth populations. How would you address the concerns of this society in order to prevent a stoppage of the proposed eradication project? What information about the moths and butterflies in question would you need to have before addressing these concerns? How would you get this information? Assuming that the project is a "GO," how would you attempt to minimize the impacts to the populations of concern? What would you do differently next year to reduce some of the misunderstandings?

GROUP 2

FACULTY ADVISOR: Larry Yarger

SCENARIO -- You are the project director for a large application project using dimillin for suppression of gypsy moths. After the first morning of spraying, you receive several phone calls from early morning joggers who were jogging in the spray block during the application. Most of the callers complained of reactions to the spray, and they claimed to have visited physicians for diagnosis and treatment of their problems. How do you handle the situation? What information needs to be collected to document that the area was sprayed according to labelled rates and that the residuals are at or below acceptable limits? What information needs to be collected in case of a tort claim? Could this incident have been avoided?

### GROUP 3

FACULTY ADVISOR: John Ghent

SCENARIO -- Your aerial application contract specifies that all application aircraft should be helicopters equipped with beecomists and that the tank mix should be applied at a rate of 1/2 gallon per acre. The VMD for the droplet size spectrum should be approximately 150 um. After awarding the contract and running the FSCBG spray model, you discuss the configuration of the spray system with the applicator. You recommend six atomizers. When the aircraft arrives for a calibration and characterization check, the pilot complains that his electrical system cannot operate six Beecomists. The pilot suggests that he can apply the designated volume through four singularly plumbed atomizers. When you check his calibration, you find the following problems:

1. The total volume recovered is less than the desired application rate.
2. Pressure adjustments (increases) do not appreciably or consistently increase the volume output.
3. The volume collected from each atomizer does not change appreciably when you increase the orifice size.
4. The demand on the aircraft's electrical system is still too high.

The insects are at the stage prescribed for treatment which means you only have a 5-day spray window to achieve the biological effectiveness outlined in your NEPA document. What could be causing these problems? How would you correct the problem(s)? Is it possible to apply the desired volume with four Beecomists?

### GROUP 4

FACULTY ADVISOR: Dan Neary

SCENARIO -- You are a new district silviculturist. One of the projects which you have inherited is to continue to regenerate a 5,000-acre tract of land which burned 5 years ago. During the 5-year period after the burn, approximately 2,000 acres or 1/2 of the suitable forest land has been regenerated. Unfortunately, an additional 2,000 acres has come back heavily to shrubs. You are considering using herbicides for site preparation for planting purposes. The ground water in the area flows into a municipal water supply. Your objective is to establish a fully stocked stand. What must you consider as you design this project to achieve your objective? Develop the ID team necessary to complete the environmental document. Select a treatment(s) and justify your selection. Be sure to describe the environmental monitoring needed to complete the project.



## GROUP 5

FACULTY ADVISOR: John Taylor

SCENARIO -- You are a range conservationist on a FS district which adjoins BLM land in Utah. You and the BLM have requested that APHIS conduct a Mormon cricket suppression project on 10,000 acres of infested lands. An EIS has been written and approved for this project. The recommended alternative is a ULV application of malathion. You have been asked to serve as the application team leader in charge of developing the specifications for contract aircraft, spraying systems, application rates, and the spraying logistics such as location of mixing/loading areas and heliports/landing strips, etc. You must also determine the weather conditions under which you will apply the material. How would you go about accomplishing your duties? Who would you contact as experts for assistance? What equipment would you consider using and why? What are the weather conditions which will help to determine your daily spray window?

## GROUP 6

FACULTY ADVISOR: Stewart Craig

SCENARIO -- You are in charge of a conifer release project using herbicides applied with a hack and squirt technique. Four people are selected to be on the crew. Describe the site and the vegetation you are interested in releasing and controlling. Select an appropriate herbicide for the job. Briefly discuss how you will train the crew to mix, transport, apply, and clean-up. Emphasize environmental and human safety. After the third day of the application, one of the crew members complains of difficulty breathing and a skin rash. What do you do immediately? What do you do before resuming the applications and during the remaining days of the project?

## GROUP 7

FACULTY ADVISOR: Jack Barry

SCENARIO -- You are a seed orchard manager of a 300-acre seed orchard in southern Alabama. You have implemented an insect monitoring system which helps you reduce the amount of insecticides applied yearly and to better target your applications to the susceptible life stages of the pests in question. Up to this date you have been using relatively high volumes and high rates of organophosphate insecticides applied via an airblast sprayer. You are interested in testing a ULV application of a new synthetic pyrethrin insecticide. Describe the procedures you might use to detect deposition within the canopy and a sampling plan for determining the duration of toxic residues. Approximately 1/4 mile from the orchard boundary is 10 acres of private property. The owner is a serious beekeeper. What can you do to mitigate the chances of killing bees? How can you work with the beekeeper to prevent problems or misunderstandings? Are there sampling procedures you might use to detect unwanted drift at the hives?

## GROUP 8

FACULTY ADVISOR: Pat Shea

SCENARIO -- You are involved with a preventive spray program against bark beetles on pine trees in several campgrounds. The district has two different makes of hydraulic sprayers. You have trained the crews using one of the sprayers and it looks like you will be able to get good bole coverage up to a 60 foot height. When you begin working with the second sprayer, you find that you can only reach a height of 30 to 40 feet. This is unacceptable. What could be some of the problems with this piece of equipment? How do you isolate the specific problem(s)? How do you correct the problem so that you can increase the height of the spray?

## GROUP 9

FACULTY ADVISOR: Jim Hadfield

SCENARIO -- A tussock moth outbreak has been detected in a mountainous region of southern Idaho. An aerial spray project has been approved and the contract has been awarded. The selected contractor has limited experience working in steep, mountainous terrain and suggests using fixed and rotary wing aircraft. The mountain range generally runs east to west with several deep canyons running north to south on the southern side of the range. You are trying to anticipate how you might aerially spray these drainages. What would you do to maximize what may be a very narrow daily spray window? Diagram the area and explain how the weather conditions might change at various locations from civil twilight (prior to sunrise) to the end of the spray day. What major weather parameters will determine when the spraying operations should end during any particular day? How could you most effectively and efficiently monitor these conditions? How could you determine if the spray is reaching the target area?

## GROUP 10

FACULTY ADVISOR: Julie Weatherby

SCENARIO -- You are responsible for developing a national advanced pesticide training program for use by the Forest Service. What topics should be covered (be specific)? How much time should be devoted to each topic? Who should attend your proposed training?

APPENDIX J

THANK YOU LETTERS





Reply To: 2150

Date: April 3, 1991

maddressn

Dear mnamen:

I am pleased to send my personal thanks for your participation as an instructor at the National Advanced Pesticide Management course conducted at Marana, Arizona, February 18 - March 1, 1991. The high quality of instruction was clearly reflected in both the student lesson and course evaluations. The success of the course is directly attributed to the preparation and delivery of quality instruction by you and your colleagues. Thanks for a job well done.

/s/Allan J. West  
ALLAN J. WEST  
Deputy Chief  
State and Private Forestry

United States  
Department of  
Agriculture

Forest  
Service

Washington  
Office

14th & Independence SW  
P.O. Box 96090  
Washington, DC 20090-6090

---

Reply to: 2150/6140

Date: April 3, 1991

Subject: National Advanced Pesticide Management

To: mnamen

Your participation on both the Steering Committee and as a Unit Leader for the National Advanced Pesticide Management Training held February 18 - March 1, 1991, is recognized and appreciated. Only those who have participated in this capacity realize the complexity and time involved. The success of your efforts is reflected in the lesson and overall course evaluations. I appreciate your hard work and leadership that contributed to a most successful course.

/s/ Allan J. West  
ALLAN J. WEST  
Deputy Chief  
FPM:JBarry:dp:3/25/91

United States  
Department of  
Agriculture

Forest  
Service

Washington  
Office

14th & Independence SW  
P.O. Box 96090  
Washington, DC 20090-6090

---

Reply to: 2150/6140

Date: April 3, 1991

Subject: National Advanced Pesticide Management

To:

Your participation as a Unit Leader for the National Advanced Pesticide Management Training held February 18 - March 1, 1991, is recognized and appreciated. The success of your efforts is reflected in the lesson and overall course evaluations. I appreciate your hard work and leadership that contributed to this successful course.

/s/Allan J. West  
ALLAN J. WEST  
Deputy Chief



United States  
United States  
Department of  
Agriculture

Forest  
Forest  
Service

Washington  
Washington  
Office

14th & Independence SW  
P.O. Box 96090  
Washington, DC 20090-6090

Reply to: 2150/6140

Date: April 3, 1991

Subject: National Advanced Pesticide Management Course

To:

I am pleased to send my personal thanks for your participation as both an instructor and a Unit Leader at the National Advanced Pesticide Management course conducted at Marana, Arizona, February 18 - March 1, 1991. The high quality of instruction was clearly reflected in both the student lesson and course evaluations. The success of the course is directly attributed to the preparation and delivery of quality instruction by you and your colleagues. I appreciate your hard work and leadership that contributed to this successful course. Thanks for a job well done.

/s/Allan J. West  
ALLAN J. WEST  
Deputy Chief







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